
COMMENTS AND RESPONSES

ON THE

GROUNDWATER PUMPING/WATER TRANSFER PROJECT
FOR 25 CONSECUTIVE YEARS

OCTOBER 3, 2007

INTRODUCTION

Completion of the CEQA and NEPA processes for the proposed Groundwater Pumping/Water Transfer Project for 25 Consecutive Years includes the lead agencies' consideration of public comments received on the Draft Mitigated Negative Declaration (MND), Draft Finding of No Significant Impact (FONSI), and the Draft Environmental Assessment/Initial Study to support the conclusions reached in the MND and FONSI. This Comments and Responses document includes the written comments received during the original public review period, July 3 through August 6, 2007 and extensions of the public review period to August 27, 2007 as requested by some commenting agencies and organizations. The NRDC/TBI comments included additional reports and memorandums, and these are attached to this report at the end as supporting material (Attachment 1).

The State Clearinghouse submitted the joint documents to selected state agencies for review. Their letter acknowledging compliance with the Clearinghouse's review requirements for draft environmental documents is attached on the following page and dated August 2, 2007. It was followed by additional letters dated August 8 that transmitted the DWR comment from the Floodway Protection Station and August 13 that sent the DFG comment from W. E. Loudermilk. The following comments were received on or before August 27, 2007:

- United States Department of the Interior, Fish and Wildlife Service, Michael B. Hoover, Assistant Field Supervisor, Sacramento Fish and Wildlife Office. August 27, 2007. (Comment USFWS)
- California Department of Fish and Game, Central Region, Dale Mitchell for W.E. Loudermilk, Regional Manager, August 6, 2007 (Comment DFG)
- California Department of Water Resources, Christopher Huitt, Staff Environmental Scientist, Floodway Protection Station, July 23, 2007 (Comment DWR)
- California Regional Water Quality Control Board, Central Valley Region, Gail Cismowski, Environmental Scientist, Agricultural Unit, August 6, 2007 (Comment CVRWQBC)
- National Resources Defense Council, The Bay Institute, Hal Candee and Gary Bobker, August 20, 2007 (Comment NRDC/TBI1)
- National Resources Defense Council, Hamilton Candee, Senior Attorney, August 27, 2007 (Comment NRDC/TBI2)

A copy of each comment letter is provided in the order listed above, followed by responses to the individual comments. Although written responses are not required for the MND and FONSI, they have been prepared for consideration by the San Joaquin River Exchange Contractors Water Authority and Bureau of Reclamation decisionmakers in their determinations of how to proceed to complete CEQA and NEPA processes and whether to approve the project. Additional technical material referenced in the responses is provided as Attachment 2 (HydroFocus report on Pilot Study, 2003).

These comments and responses and supporting attachments become part of the Administrative Record for the project.



ARNOLD SCHWARZENEGGER
GOVERNOR

STATE OF CALIFORNIA
GOVERNOR'S OFFICE of PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT



CYNTHIA BRYANT
DIRECTOR

August 2, 2007

Joann Toscano
San Joaquin River Exchange Contractors Water Authority
541 H Street
Los Banos, CA 93635

RECEIVED

AUG 13 2007

S.J.R.E.C.W.A.

Subject: Groundwater Pumping/Water Transfer Project for 25 Consecutive Years
SCH#: 2007072012

Dear Joann Toscano:

The State Clearinghouse submitted the above named Joint Document to selected state agencies for review. The review period closed on August 1, 2007, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts
Director, State Clearinghouse

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

**Document Details Report
State Clearinghouse Data Base**

SCH# 2007072012
Project Title Groundwater Pumping/Water Transfer Project for 25 Consecutive Years
Lead Agency San Joaquin River Exchange Contractors Water Authority

Type JD Joint Document
Description Two members of the San Joaquin River Exchange Contractors Water Authority (Firebaugh Canal Water District and Central California Irrigation District) propose to pump groundwater (up to 15,000 AFY) for blending and use with CCID and develop up to 5,000 AFY from conservation and/or temporary land fallowing, for a maximum of 20,000 AFY, transfer of substitute water to certain CVP agricultural, municipal, and industrial water users in the San Luis Unit and San Felipe Division of the CVP for as long as 25 consecutive water years.

Lead Agency Contact

Name Joann Toscano
Agency San Joaquin River Exchange Contractors Water Authority
Phone (209) 827-8616 **Fax**
email
Address 541 H Street
City Los Banos **State** CA **Zip** 93635

Project Location

County Fresno, Kings, Madera, Merced, Santa Clara, Stanislaus
City Fresno, Los Banos, Mendota, Firebaugh
Region
Cross Streets
Parcel No.
Township **Range** **Section** **Base**

Proximity to:

Highways 99, 5, 33, 152, 101
Airports
Railways Yes
Waterways San Joaquin River
Schools
Land Use Land use is primarily open space, including agriculture

Project Issues Agricultural Land; Air Quality; Archaeologic-Historic; Cumulative Effects; Economics/Jobs; Other Issues; Social; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife

Reviewing Agencies Caltrans, District 10; Department of Conservation; Department of Water Resources; Department of Fish and Game, Region 2; Department of Health Services; Office of Historic Preservation; Native American Heritage Commission; Department of Parks and Recreation; Resources Agency; State Water Resources Control Board, Clean Water Program; State Water Resources Control Board, Division of Water Quality; State Water Resources Control Board, Division of Water Rights

Date Received 07/03/2007 **Start of Review** 07/03/2007 **End of Review** 08/01/2007

Note: Blanks in data fields result from insufficient information provided by lead agency.



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GOVERNOR

STATE OF CALIFORNIA
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CYNTHIA BRYANT
DIRECTOR

August 8, 2007

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AUG 20 2007

S.J.R.E.C.W.A.

Joann Toscano
San Joaquin River Exchange Contractors Water Authority
541 H Street
Los Banos, CA 93635

Subject: Groundwater Pumping/Water Transfer Project for 25 Consecutive Years
SCH#: 2007072012

Dear Joann Toscano:

The enclosed comment (s) on your Joint Document was (were) received by the State Clearinghouse after the end of the state review period, which closed on August 1, 2007. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document.

The California Environmental Quality Act does not require Lead Agencies to respond to late comments. However, we encourage you to incorporate these additional comments into your final environmental document and to consider them prior to taking final action on the proposed project.

Please contact the State Clearinghouse at (916) 445-0613 if you have any questions concerning the environmental review process. If you have a question regarding the above-named project, please refer to the ten-digit State Clearinghouse number (2007072012) when contacting this office.

Sincerely,

Terry Roberts
Senior Planner, State Clearinghouse

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
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CYNTHIA BRYANT
DIRECTOR

August 13, 2007

RECEIVED

AUG 15 2007

S.J.R.E.C.W.A.

Joann Toscano
San Joaquin River Exchange Contractors Water Authority
541 H Street
P.O. Box 2115
Los Banos, CA 93635

Subject: Groundwater Pumping/Water Transfer Project for 25 Consecutive Years
SCH#: 2007072012

Dear Joann Toscano:

The enclosed comment (s) on your Joint Document was (were) received by the State Clearinghouse after the end of the state review period, which closed on August 1, 2007. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document.

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Sincerely,

Terry Roberts
Senior Planner, State Clearinghouse

Enclosures

cc: Resources Agency

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
 Sacramento Fish and Wildlife Office
 2800 Cottage Way, Room W-2605
 Sacramento, California 95825-1846

BUREAU OF RECLAMATION OFFICIAL FILE COPY RECEIVED		
AUG 28 2007		
CODE	ACTION	SURNAME & DATE
150	/	R. Eckart



IN REPLY REFER TO:
 1-1-07-I-1580

Memorandum

AUG 27 2007

To: Mr. Robert Eckart, Supervisory Natural Resources Specialist, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento, California

From: *Michael B. Brown*
 Assistant Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Comments on Draft EA/IS for 25-Year Groundwater Pumping/Water Transfer Project for the San Joaquin River Exchange Contractors Water Authority

This memo submits comments of the U.S. Fish and Wildlife Service (Service) on the Draft Environmental Assessment/Initial Study (EA/IS) for a 25-Year Groundwater Pumping/Water Transfer Project (GW/Transfer Project) proposed by the San Joaquin River Exchange Contractors Water Authority (SJCWA). We appreciate the additional time provided by the SJCWA and Reclamation to allow the Service adequate time for review of the EA/IS. The SJCWA agreed in an August 14, 2007 e-mail to extend the comment period of this project for the Service until August 27, 2007. The Service is providing these comments under authority of the National Environmental Policy Act (NEPA)(40 CFR Part 1500), and within associated guidance from the President's Council on Environmental Quality. Our focus in providing these comments is to assist Reclamation in its efforts to "...make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment" [40 CFR Part 1500.1(c)]. We are also providing comments on the EA/IS for the GW/Transfer Project pursuant to section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(ESA). Based on our review of the EA/IS we also recommend that Reclamation initiate consultation pursuant to section 7(a) of the ESA.

Background

The proposed GW/Transfer Project has its origins in: 1) the need to either supplement water supply deficiencies or provide additional water for Central Valley Project (CVP) contractors and. 2) in the need for subsurface drainwater management. Two areas within the Exchange Contractors' service area, Firebaugh Canal Water District (FCWD) and the Camp 13 area of Central California Irrigation District (CCID) are currently affected by the shallow levels of highly saline groundwater that reach the crop root zone, adversely affecting the productivity of this area. FCWD and Camp 13 are proposing to undertake actions to pump groundwater and transfer a commensurate portion of their CVP supply (substitute water) to provide a funding

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 AND SHURE PLEASE INSERT
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 INITIAL
 DATE

Classification	EDU 2.00
Project	214
Contract No.	07074609
Order ID	1040326
Date Rec'd & Initialed	8/28/07

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento

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mechanism to “provide capital improvement funding to control drainwater production in areas affected by shallow groundwater.” The capital improvement funding for drainage control is explained in more detail in the July 30, 2007 document titled, Implementation of Drainage Services, Draft Collaborative Drainage Resolution: “...in exchange for 10,000 acre-feet of groundwater developed within Firebaugh and Camp 13 drainage area of CCID, Westlands will pay for Firebaugh’s and Camp 13’s drainage water treatment and disposal O&M expenses and one half of all other O&M costs of the WRDP [Westside Regional Drainage Plan].”

Pumping of groundwater in the semi-confined aquifer (above the Corcoran clay layer) from drainage impacted areas (groundwater management) was included in the final report of the San Joaquin Valley Drainage Program (SJVDP 1990) as one of a suite of management actions that, when implemented together, would manage the drainage problem for 50 years, while protecting the environment and public health, and maintaining agricultural productivity. The concept presented in SJVDP final report included:

- pumping ground water, generally for irrigation, from the semiconfined aquifer above the Corcoran Clay to lower near-surface saline water tables and create hydrologic balance that will keep the shallow water table below the crop root zone;
- groundwater management extractions would be in addition to present extractions, and would be designed specifically for each drainage problem area in which it is applicable.

The SJVDP noted this method would be technically feasible only if all the following conditions existed in the subsurface aquifers under the drainage problem area: (1) Adequate vertical hydraulic interconnection between the pumped aquifer system and the waterlogged surface lands (not applicable to the Tulare lakebeds where thick clays are present); (2) a sufficient volume of water in the deep aquifer to allow withdrawal for a reasonable period of time (for example, 20 years); and (3) pumped groundwater quality with a total dissolved solids (TDS) concentration of less than 1,250 ppm (mg/L), so that it could be used for agricultural irrigation. The limitations of this strategy were described as: (1) the periods during which wells must be pumped to lower the water table to the required depth and the period in which they are pumped to supply water for irrigation or other beneficial uses may not correspond; (2) the application of this strategy may be viewed as a planned degradation of the groundwater resource, even though this degradation is occurring under existing conditions; and (3) if this alternative were economically feasible, the aquifer must be capable of producing water suitable for beneficial uses for at least 20 years.

Proposed Action

The Proposed Action would develop up to 20,000 acre-feet/year (AFY) of substitute water from a combination of groundwater pumping and conservation/rotational land fallowing. Based on the groundwater analysis (Appendix A of the EA/IS), the Proposed Action would include a maximum groundwater pumping regime of 15,000 AFY. The new groundwater pumping program would consist of up to 15 new wells (and 5 existing wells) using diesel-driven pumps. All 15 new wells are to be located in FCWD and the Camp 13 area of CCID, adjacent to the CCID Main and Outside Canals and the Delta Mendota Canal (DMC). The groundwater would be pumped from the upper aquifer above a depth of 350 feet (above the Corcoran clay) but below

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 3

the drainage impaired shallow groundwater, blended with surface water deliveries into two CCID canals (Outside and Main) to ensure adequate water quality for irrigation needs, and then delivered downstream for agricultural use and refuge water supplies. The pumped groundwater would substitute for CVP surface water delivery primarily from the DMC.

The Proposed Action of the GW/Transfer Project EA/IS would free up a commensurate quantity of water of the SJECWA contract supply equivalent to the quantity developed by this project (up to 20,000 AFY) for transfer to San Luis Unit contractors and Santa Clara Valley Water District. The Proposed Action would allow for delivery of up to 20,000 acre-feet per year (AFY) to any or all of the following users:

- CVP San Luis Unit agriculture service contractors, up to 20,000 AFY;
- Local CVP M&I uses in Santa Clara Valley Water District (up to 2,000 AFY);
- and/or CVP M&I uses in San Luis Water District (up to 5,000 AFY) of which 3,000 AFY would be allocated specifically to serve a new proposed development (the Villages).

The duration of the Proposed Action is for 25 consecutive Water Years. The water to be made available for transfer would be in addition to the Exchange Contractors' recent 10-year transfer program of up to 130,000 AFY for 2005–2014 (USBR 2004).

The Proposed Action includes the development of up to 5,000 AFY of water from conservation and/or rotational land fallowing. Conservation measures employed would include canal lining and drip irrigation techniques; no tailwater recovery would occur. Rotational land fallowing would be in addition to normal crop rotation practices. This land fallowing would rotate the affected lands each year such that there would be no land fallowing in the next consecutive four years of the same acreage.

The potential sources of the 20,000 AFY of water to be developed for exchange are:

- First priority is groundwater pumping (15,000 AFY);
- Second priority will be water conservation projects (canal lining and drip irrigation); and,
- Third priority will be the temporary (rotational) fallowing of land where such actions would benefit/control shallow groundwater levels.

Comments Specific to Effects of Groundwater Pumping

Potential degradation of groundwater not adequately addressed

- 2 The proposed well field identified in the EA/IS is overlain by a shallow drainwater impacted area that includes the DMC sumps. These sumps pump highly saline, shallow groundwater in the FCWD into the DMC. Recent water quality monitoring of these sumps has documented extremely elevated concentrations of salt, selenium and mercury. Salt concentrations of this
- ✓ water, measured as electrical conductivity (EC), have averaged between approximately 6,100

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento

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and 8,100 uS/cm. Selenium concentrations in water from the DMC sumps are highly variable (varying by time of year and by sump) and range from below 100 µg/L to over 1,000 µg/L. Total mercury in water from the DMC sumps has ranged from 200 ng/L to 3,000 ng/L (USBR, April 2007).

The EA/IS notes the following with respect to effects to groundwater in the water development area: *There are five potential impacts that may occur in association with the Proposed Action in the water development area. These consist of: 1) drawdowns in the upper aquifer, 2) drawdowns in shallow wells, 3) groundwater flow into Madera County, 4) land subsidence, and 5) groundwater quality. In summary, the most important issue of the Proposed Action for groundwater resources would be a reduction in the northeasterly migration of poor quality groundwater, and a lessening of the deterioration of groundwater quality in adjoining parts of the existing CCID and in Madera County, which would actually result in an overall benefit for the CCID/Madera County areas.* The EA/IS does not analyze the potential for degradation of the production wells by downward migration of the contaminated shallow groundwater, yet this has been identified by other planning efforts as an anticipated effect of groundwater management in drainage impacted areas. As was noted in the Final Report of the SJVDP, groundwater management may be viewed as a planned degradation of the groundwater resource, even though this degradation is occurring under existing conditions (SJVDP 1990).

As part of the SJVDP Planning effort, a finite element model was used to develop a detailed analysis of pumping the semi-confined aquifer for management of the shallow water table (Quinn, et al., 1990). The results of the analyses showed the importance of well field design and such factors as depth of pumping, pumping rate, and aquifer properties for achieving management of the shallow water table through groundwater pumping. More accurate data on the hydraulic properties of the semi-confined aquifer and the spatial distribution of contaminants in the aquifer would be required in order to implement this solution to the drainage problem. The authors of the 1990 study concluded that groundwater pumping appears to be a short to medium term solution and would likely hasten the ongoing process of aquifer degradation, shortening the useable life of the semiconfined aquifer in some cases to less than 25 years (Quinn et al., 1990; Quinn 1991).

Table 1. compares groundwater management recommendations of the SJVDP for the Grasslands subarea with the proposed action in the EA/IS. The SJVDP recommended groundwater management involving pumping of 8,000 AFY from a 10,000 acre area of Zone A (comprised of drainage impacted areas in CCID and FCWD). The 8,000 AFY was identified as a "safe yield" and the extractions were to occur from low-capacity - 200 gallon per minute (gpm) wells drilled on an evenly spaced quarter-mile grid, to tap the semiconfined aquifer beneath Exchange Contractors' lands. The EA/IS for the proposed GW/Transfer Project would involve pumping 15,000 AFY from 28,000 acre area of drainage impaired lands. As denoted in Table 1., the quantity proposed for pumping would be almost double what was recommended by the SJVDP as safe yield, TDS concentrations are well above those recommended by SJVDP, and the well field will be localized along three canals. As a result, groundwater degradation of the aquifer in the well field may be accelerated beyond what was modeled in the SJVDP.

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento

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Table 1. Comparison of Groundwater Management from SJVDP Final Report and EA/IS

Groundwater Pumping Parameter	SJVDP Recommendations	EA/IS
Quantity to be pumped	8,000 AFY	15,000 AFY
Area of well field	10,000 acres	28,000 acres
Well spacing	Even spacing/quarter mile grid	20 wells (comprised of 15 new and 5 existing) located adjacent to the CCID Main and Outside Canals and the Delta Mendota Canal (DMC), average spacing between the wells proposed to be pumped would be about 4,500 feet.
TDS concentration to be pumped	Less than 1,250 ppm (mg/L)	Water concentrations from sample wells in the project area ranged from 2,400 - 5,525 mg/L
Groundwater management on upslope lands (Westlands Subarea)	16,000 AF/year from 19,000 acre area	Not available
Pumping rate	200 gpm	All 20 wells are assumed to be pumped continuously at 1,900 gpm each

The U.S. Geological Survey, in cooperation with the SJVDP and as part of the Regional Aquifer System Analysis Program completed a report on the sources, distribution, and mobility of selenium in the San Joaquin Valley, California (Gilliom and others, 1989). This report noted the following with respect to groundwater pumping in the drainage impacted area: *"The large quantity of high-selenium ground water (50 to 1000 µg/L) in the general range of 20 to 150 feet below the water table makes it desirable to use management practices that leave this water where it is, rather than bring it to the land surface or allow it to move into parts of the aquifer that may be used for water supply. Water-table control strategies based on increasing groundwater discharge need to be carefully evaluated with respect to their potential to affect the movement of water with high selenium concentrations."*

- 5 The San Joaquin Valley Drainage Implementation Program (SJVDIP) in their Final Report of the Groundwater Management Technical Committee (1999) noted that: *"Adverse consequences of the groundwater management include acceleration of water quality degradation and potential reinitiation of subsidence, however, uncertainty exists about the timing and severity of these*

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 6

consequences. If the groundwater management option is implemented, it should be executed adaptively and with an improved understanding of the groundwater system. That is, when the onset of adverse consequences is detected, surface water deliveries and groundwater pumping rates can be adjusted in space or time to mitigate these consequences. This adaptive management approach requires monitoring of pumping rates, groundwater levels, and water quality." Consistent with the recommendations of the SJVDIP on groundwater management, the EA/IS should include an adaptive management program that adjusts surface water deliveries and groundwater pumping rates to mitigate adverse consequences of groundwater degradation.

The Service concurs with the comments of the Central Valley Regional Water Quality Control Board (CV Regional Board) on this project, dated, August 6, 2007 with respect to groundwater degradation: "Pumping from this aquifer (above the Corcoran clay) will likely result in drawdown of the water currently near the surface, causing selenium, additional salts and other materials currently present at shallower depths to migrate deeper. If this is the case, mitigation measures should be evaluated and implemented where feasible." The EA/IS should analyze the potential for degradation of the production wells, and include mitigation or contingency measures should well water become unusable for downstream uses.

Groundwater pumping from drainage-impacted aquifer is unlikely to produce a reliable, long term supply of adequate quality water

At least 13,000 AFY of water from this project is proposed for long-term use in SLWD and Westlands. The EA/IS and draft FONSI note that 3,000 AF is "under discussion" to serve a new proposed development ("Villages") within the San Luis Water District. An additional commitment of transferred water from this GW/Transfer Project is included in the July 30, 2007 document titled, Implementation of Drainage Services, Draft Collaborative Drainage Resolution: "...in exchange for 10,000 acre-feet of groundwater developed within Firebaugh and Camp 13 drainage area of CCID, Westlands will pay for Firebaugh's and Camp 13's drainage water treatment and disposal O&M expenses and one half of all other O&M costs of the WRDP." This language implies that the transfer of 10,000 AFY of water from this project to Westlands would occur for an unspecified period of time. Due to the potential for groundwater degradation of production wells over the life of the project, the EA/IS should identify mitigation measures or contingencies in the event that the quantity of water available from groundwater pumping proposed in this project is reduced due to degradation of production wells.

Upslope Drainage Impacts

The EA/IS notes, "The application of irrigation water upslope has resulted in increased pressures transmitted downslope into the Exchange Contractors' service area. The pressure causes poor-quality water to rise into crop root zones and drainage systems within the Exchange Contractors' service area (C. White, pers. comm., 2006)." The SJVDP Final Report recommended that groundwater management be implemented with a suite of actions to address the drainage problem in the San Joaquin Valley through 2040. That suite of actions included groundwater management in the Westlands Subarea over an area of 19,000 acres, and involving pumping of 16,000 AFY. We are unaware of any groundwater management currently taking

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento

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place in the Westlands subarea. However, as is noted in the Drainage Settlement Proposal (dated July 30, 2007), 10,000 AFY of water freed up by the program in the EA/IS for this project would be allocated to upslope lands in Westlands. The EA/IS should analyze the effects of the proposed transfer of 10,000 AFY to upslope lands on hydraulic pressure transmitted downslope and its effect on the usable life of the aquifer.

Subsidence Issues

Between 1984 and 1996, land subsidence was recorded along the lower reaches of the DMC and has been attributed to groundwater pumping. The year-to-year subsidence cannot be determined for the period; however, this area experienced nearly a foot of subsidence between surveys (SJVDIP 1999). Some of this subsidence occurred at groundwater levels above historic lows, suggesting that historical compaction of the clays was still underway until groundwater levels began to rebound in the mid 1960's. Bull and Poland (1975) noted the lower DMC crosses an area compacted in a delayed manner. It was anticipated that ongoing subsidence rates would be low but that the onset of additional groundwater pumping could increase subsidence rates.

With respect to subsidence as a result of groundwater management, the EA/IS notes the following: *"For the Proposed Action, pumping water levels would be about the same as historically measured in and near the MPG well fields. Projections indicate that the total irreversible subsidence due to pumping for the Proposed Action would be less than 0.2 foot over the proposed 25-year pumping program. This is relatively small compared to subsidence in the area from deep well pumpage in adjoining areas."* Due to the history of subsidence in this area, the EA/IS should identify what mitigative actions would take place if subsidence exceeded the 0.2 feet over the life of the 25-year of the project.

Quality of Extracted Water

No standards are established for extracted water

With respect to downstream effects, the EA/IS notes, *"The Proposed Action does not result in violations of specific standards within the project area. Since the Proposed Action does not affect the quality of water provided to CCID's southern area or the wildlife management areas served adjacent to CCID's southern area, nor does the quality of water used by other diverters of Mendota Pool change, there is no change in water quality anticipated to the outflow of water from the area to the San Joaquin River."* However, the EA/IS does not include any commitment(s) that extracted water will meet performance standards to protect downstream uses, including wetland water supplies. Instead, the EA/IS assumes that certain concentrations of constituents will remain constant over the life of the project (e.g., TDS 2,000 mg/L and no detectable selenium). As discussed previously, groundwater pumping in the EA/IS may result in drawdown of poorer quality water currently near the surface, causing selenium, additional salts, and other materials currently present at shallower depths to migrate deeper in the aquifer. As a result, the EA/IS should include an adaptive management program that adjusts surface water deliveries and groundwater pumping rates to mitigate adverse consequences of groundwater

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 8

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degradation and protect downstream uses. To address downstream uses, the EA/IS should include a list of applicable water standards/objectives (e.g., TDS concentrations for irrigation suitability in CVP contracts, selenium objectives in Grassland Marshes, etc) and identify how the proposed GW/Transfer Project will ensure that groundwater pumping into supply canals will not affect the achievement of those standards. Finally, the EA/IS should consider the refuge water directive of Section 3406(d) of the CVPIA, requiring firm water supplies of suitable quality to maintain and improve wetland habitat on units of the National Wildlife Refuge System in the Central Valley of California, Los Banos and North Grasslands wildlife management areas; and on the Grasslands Resources Conservation District.

TDS effects in Grasslands refuge water supplies not adequately addressed

The U.S. Bureau of Reclamation in May 2007 provided to the Service a Memorandum (Memo) that clarifies responsibility for return flows and drainage from Refuges (Attachment A). As noted in this Memo, the Service is responsible for compliance with all State of California and Federal water quality standards and directives applicable to surface return flows and subsurface agricultural drainage discharges generated within the boundaries of the Refuges. Pursuant to Section 303(d) of the Clean Water Act, the CV Regional Board has adopted a Total Maximum Daily Load (TMDL) for salinity in the San Joaquin River (SJR River Salt TMDL) based on water quality objectives at the south Delta boundary (Vernalis). That TMDL allows an individual discharger or group of dischargers (including managed wetlands) to calculate their load allocation by multiplying the nonpoint source acreage drained times the load allocation per acre (Oppenheimer and Groeber, September 2004). Because the salt that Federal Refuges in the Grasslands Area discharge to the San Joaquin River comes from the supply water (Beckon and Milar, 2003), the Service, in consultation with the CV Regional Board calculated an Electrical Conductivity (EC) concentration needed in supply water to achieve the salt TMDL load limits (Attachment B). For example, in March of a dry water year, these calculations indicate that CVP supply water delivered to the Kesterson Unit of the San Luis National Wildlife Refuge would need to have an EC concentration of 635 $\mu\text{S}/\text{cm}$ or less for the Federal Refuges in the Grasslands to comply with the San Joaquin River Salt TMDL.

Table 3 from Appendix D of the EA/IS provides generalized monthly EC concentrations in the Outside and Main Canals (included below).

Table 3
Generalized Water Quality Diverted to Main Canal and Outside Canal at Mendota Pool (DMC source)

EC - $\mu\text{S}/\text{cm}$	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mendota Pool												
Wet	500	500	500	460	470	407	334	364	361	366	500	532
Above Normal	550	550	542	483	471	450	355	373	391	401	552	623
Below Normal	558	561	544	489	475	450	365	379	475	537	580	630
Dry	650	615	620	553	480	450	370	485	610	599	572	630
Critical	732	760	814	889	882	766	785	693	699	690	742	780

Based on historical 1963-2004 records, DMC Check 21.

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento

9

Refuge water supplies from the Outside and Main Canals are further degraded by the time they reach Refuge units as shown in Figure 1.

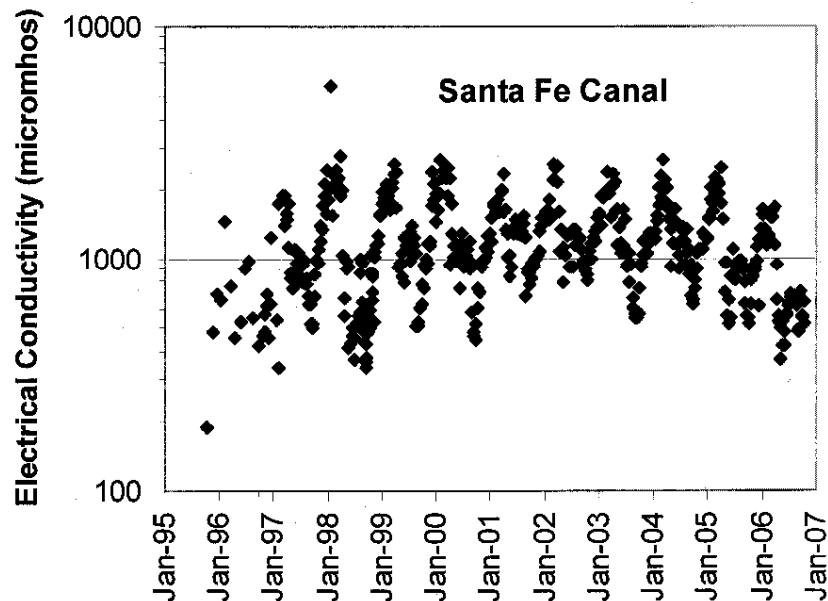


Figure 1. Electrical conductivity (EC) measurements in water in the Santa Fe Canal, which supplies wetlands in the northeast portion of the Kesterson Unit of the San Luis National Wildlife Refuge Complex. The data were collected by the California Regional Water Quality Control Board, Central Valley Region (<http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/sjrsites.html#sjc501>).

12 As denoted in the EA/IS, the proposed action is expected to lessen water quality in the Main Canal (the supply source to some wildlife management areas in the Grasslands) by 30 to 70 uS/cm EC during March through October of non-critical years and up to 90 uS/cm EC during critical years (equating to roughly an 8-12% increase in EC/TDS concentrations). A TDS increase of 8 to 12 % in the Main Canal would cascade through the delivery systems resulting in an increase of TDS delivered to Refuge units which already receive water at and above water quality standards.

13 In addition, the increase in EC concentrations in refuge water supplies predicted in the EA/IS is based on the assumption that water quality of extracted water would be 3,200 uS/cm or approximately 2,000 mg/L TDS. Although the EA/IS concludes that this is a small water quality effect, it nonetheless could cumulatively compromise the ability of the Grassland Refuges to meet their obligations to comply with the SJR Salt TMDL. Further, as there are no water quality standards imposed on the extracted water in the EA/IS, the EC/TDS concentrations in Refuge water supplies could actually be higher than projected in the EA/IS during the life of the project.

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 10

Water quality effects of the GW/Transfer Project to refuge water supplies needs to be adequately addressed and mitigated in the EA/IS for this project.

Annual monitoring of selenium is insufficient to ensure compliance with water quality objectives

14 The EA/IS commits to the following with respect to water quality monitoring *"Flowmeters would be installed on each of these wells and read weekly during the duration of pumping. Static water levels in each well would be measured in the spring and fall, and also just prior to the commencement of pumping from these wells each year. Pumping levels would be measured in these wells on a monthly basis during pumping periods. Water samples would be collected near the end of the peak pumping period from each well for irrigation suitability and selenium analyses. Monthly samples would be analyzed for electrical conductivity."* Because the well field is overlain with a shallow groundwater table that contains elevated selenium concentrations, it is likely that concentrations of selenium in project wells will increase over the life of the project. The Service therefore recommends that extracted water be analyzed for selenium monthly to ensure that the 2 µg/l monthly mean water quality objective for the Grassland Marshes is met.

The EA/IS notes that *"the pumped groundwater does not contain selenium"*. However, Hydrofocus (2003) reported concentrations of selenium in the aquifer to be pumped as follows, *"Based on data collected for production and monitoring wells, selenium concentrations range from less than .0001 to 0.012 mg/L [less than 1 to 12 µg /L] in the lower portion of the semiconfined aquifer."* The EA/IS should more accurately represent the current selenium conditions in the semiconfined aquifer.

Mercury should be added as a constituent for monitoring of extracted water

Water quality sampling of the Delta Mendota Canal (DMC) sumps (along the Delta Mendota Canal in the FCWD and within the area projected for the well field in the EA/IS) from 2002 through 2007 by USBR for total mercury has documented significantly elevated concentrations of total mercury in the DMC sump water currently being pumped into the Delta Mendota Canal. Total mercury in water from the DMC sumps has ranged from 200 ng/L to 3,000 ng/L and is currently being pumped into the DMC upstream of Mendota Pool (USBR, April 2007).

Eighteen miles of Panoche Creek (from Silver Creek to Belmont Avenue) and the San Joaquin River (from Bear Creek to the Delta Boundary) are listed on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segment[s] for mercury impairment (SWRCB 2006). Mercury levels in fish from the lower San Joaquin River and Mud Slough have been found to be elevated (Davis *et al.* 2000; Slotton *et al.* 2000). The principal finding of a CalFed Mercury Study in the San Joaquin Basin is that Mud Slough contributes about 50 percent of the methylated mercury at Vernalis (legal boundary of the Delta) but only 10 percent of the water volume during the non-irrigation season (September to March) (Stephenson *et. al.*, 2005).

The Office of Health Hazard Assessment has issued "Draft Safe Eating Guidelines" based on

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mercury for fish in the San Joaquin River (from Port of Stockton to Friant Dam). The Draft Guidelines recommend that women of childbearing age, pregnant or breastfeeding women, and children 17 years and younger avoid consumption of largemouth, smallmouth or spotted bass from this reach of the San Joaquin River (Gassel et al., 2007).

- 15 As a result of elevated mercury concentrations from sump water collected in the proposed well field area of this project, the Service recommends that extracted water be monitored initially on a monthly basis for total and methyl mercury to establish baseline conditions. The frequency of such monitoring can be adjusted depending on the initial monthly monitoring results. A methyl-mercury standard should be applied to extracted water. The Regional Board has proposed a safe methyl mercury TMDL goal to protect human health and wildlife consuming fish in the Delta of 0.06 ng/L (Foe, 2005).

Additional Comments

Project may be inconsistent with CVPIA transfer provisions

- 16 The Draft FONSI and DEA/IS states that Reclamation would need to review and approve each new transfer to ensure that the transfer meets "*applicable Federal and State laws, including policies and procedures governing transfer of CVP surface supplies and, in particular, the Central Valley Project Improvement Act of 1992 (CVPIA), Section 3405.*" Section 3405 a(1)(J) of the CVPIA states that:
"The Secretary shall not approve a transfer authorized by this subsection unless the Secretary determines, consistent with paragraph 3405(a) (2) of this title, that such transfer will have no significant long-term adverse impact on groundwater conditions in the transferor's service area."
- Although groundwater management is one of a suite of options that have been identified for management of subsurface drainage problems in the San Joaquin Valley, as was noted in SJVDIP 1999 report on Groundwater Management citing Quinn 1990 and 1991, "*groundwater pumping appears to be a short-to-medium-term mitigation measure at best, and will likely hasten an ongoing process of aquifer degradation, shortening the useable life of the semi-confined aquifer, in some cases to fewer than 25 years.*" Given the fact that the well field for the proposed project is within the drainage impacted area of the CCID and FCWD and that prolonged pumping could eventually degrade the wells of this project, this project could violate Section 3405 a(1)(J) of the CVPIA by accelerating degradation of the aquifer in the project area. This issue needs to be addressed in the EA/IS.

Cumulative Effects Not Adequately Addressed

- 17 The Final Report of the Groundwater Technical Committee of the SJVDIP recommended that either a Programmatic EIR/EIS be completed or a Cumulative EIS/EIR be completed that would assess the overall impacts of a regional groundwater management program (SJVDIP 1999). The SJVDIP groundwater report noted that "A Cumulative Impacts EIR/EIS assessment should combine the impacts of a number of similar projects which, individually, may not have a

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 12

significant impact on the environment.”

The EA/IS does not consider the effect of this project cumulatively with other existing projects. For example, other similar projects in the vicinity of the GW/Transfer Project include: the San Joaquin Exchange Contractor's 10-year Transfer Program, and the Grassland Bypass Project (including the proposed expansion of the San Joaquin River Improvement Reuse Area). Of particular concern is the effect of the GW/Transfer Project in combination with other similar projects on the achievement of water quality objectives in the Grasslands wetland supply channels and the San Joaquin River.

The San Joaquin Exchange Contractor's 10-year Transfer Program

In 2004, Reclamation finalized an EIS/EIR on the San Joaquin Exchange Contractors' 10-year Transfer Program (SJEC EIS/EIR; USBR 2004). This program allows for the transfer of up to 130,000 ac-ft/year of substitute water annually to several potential agricultural, municipal and wetland users for a period of 10 years. The preferred alternative would develop up to 130,000 acre feet of water during non-critical years, with up to 80,000 acre feet of water made available through conservation (including tailwater recovery) and groundwater (up to 20,000 acre feet) and up to 50,000 acre feet of water made available through crop idling/temporary land fallowing. During critical years, up to 50,000 acre feet of water may be made available through crop fallowing, and no water is to be made available from conservation/tailwater recovery and groundwater resources.

Modeling of the effects of the preferred alternative in the SJEC EIS/EIR estimated up to a 47 percent flow reduction in Mud and Salt Sloughs during the late spring and dry and below normal water years. The largest reductions in flow would occur during April (36 percent) and May (47 percent) as shown in Table 6-5 of that document. Reclamation determined that the flow reduction would not have a significant effect on the extent or quality of the aquatic or upland habitats in Mud and Salt Sloughs because the flow reductions were in the normal range of fluctuation that occurs during normal and dry/below normal years. The Final SJEC EIS/EIR did not, however, compare the frequency of such flow reductions between the “with project” and “without project conditions”. The effect of reduced flows in Mud and Salt Slough on selenium concentrations in these channels was likewise not analyzed (pers. comm. Steve Leach, Senior Biologist, URS Corporation, March 6, 2006). It is reasonable to expect that a reduction of flow in these channels combined with continued selenium inputs from outside the SLDFR Project area could result in higher selenium concentrations and potentially a greater frequency of occurrence of water quality objective exceedences in these channels.

Modeling of the effect of the preferred alternative in the SJEC EIS/EIR also indicated reduction in flows in the San Joaquin River at Vernalis. These reductions were shown to vary from 0 to 11 percent. During the late spring out-migration period for anadromous fish, flows would be reduced by 3 to 8 percent (Table 4-44 of the SJEC EIS/EIR). Summer flow reductions would be as high as 11 percent in July. Smaller (2 percent) reductions were predicted in the fall when salmonids begin to migrate upstream in the San Joaquin River. Reclamation determined these reductions in flow did not have a significant effect on the flow or water quality in the San Joaquin River because flow reductions were still within the range of interannual variations in

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 13

monthly river flow as shown in Table 4-1 of that document.

Panoche Drainage District's Expansion of the Grassland Bypass Project's Reuse Area

Panoche Drainage District (PDD) conducted an Initial Study and adopted a Negative Declaration on September 19, 2000, for the acquisition of up to 6,200 acres of land for the irrigation of salt-tolerant crops with subsurface drainage water (reuse). The reuse area was designed to immediately reduce discharges to the San Joaquin River from approximately 97,400 acres participating in the Grassland Bypass Project and was designated the "San Joaquin River Improvement Project" (SJRIIP). On May 25, 2001, the Final EIS/EIR for the Grassland Bypass Project was completed (2001 EIS/EIR), analyzing the environmental effects of continued use of the San Luis Drain to convey subsurface agricultural drainage out of the Grassland Drainage Area ("GDA"). This document incorporated into the project the "In-Valley Treatment/Drainage Reuse" feature for the entire 6,200 acres. Using grant funding from the State of California, PDD acquired 4,000 acres of land, but due to lack of funding, did not acquire the final 2,200 acres.

In addition to the 2,200 acres planned for purchase that was analyzed in the 2000 Initial Study, an additional 400 to 700 acres within a 6,100 acre area discussed in the 2007 Draft Mitigated Negative Declaration and Initial Study (Draft MND&IS) are being considered for purchase, which would result in a total area of 6,900 acres dedicated to drainage reuse. The Draft MND&IS for the SJRIIP expansion was intended to supplement the 2000 Initial Study, provide updates, and analyze the effects of utilizing several alternate sites. This study considered the use of some of the 6,100 identified potential target acres for a short duration (1 -5 years) until funding is available to purchase the up to 2,900 acres necessary for the permanent project. Land utilized for the short-term project would be capable of full restoration to agricultural land and would not necessarily be the same land within the target area that will ultimately be acquired for permanent, long-term project implementation. All of the lands identified for the Proposed Project lie within, or adjacent to the boundaries of one or more of the following: Central California Irrigation District (CCID), Eagle Field Water District, Mercy Springs Water District, Oro Loma Water District, PDD and San Luis Water District located in western Fresno and Merced Counties. The lands are surrounded by agricultural land in a rural agricultural setting. A portion of the lands being considered for the SJRIIP expansion are bounded to the North by privately owned wetlands in the South Grasslands. The lands are generally bounded by the Delta-Mendota Canal to the south and the Main Canal to the north. The lands extend to the west 7 miles west of Russell Avenue and to the east to approximately Fairfax Avenue.

The SJRIIP Reuse facility is immediately adjacent to and upslope of the well field proposed in the GW/Transfer Project EA/IS. The Cumulative Effects section of the EA/IS should analyze the effect of the SJRIIP reuse area and proposed expansion (irrigation of agricultural lands with drainage water) on groundwater conditions downslope in the proposed well field of the GW/Transfer Project.

Commitments to avoid land conversions

↓ The DEA notes that, "No new lands would be brought into agricultural production or other

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 14

undeveloped, non-urban land would not be converted to urban uses." However, it is unclear how such a commitment would be enforced or which entity or agency would be responsible for such enforcement.

The EA/IS further notes, "Use of transfer water for M&I uses would not occur until full compliance with ESA/CESA has been accomplished unless the water purchasers within the SLWD or SCVWD have determined that such conversion would not likely affect listed species or that appropriate mitigation has been provided, in consultation with Reclamation and the Service." We recommend this wording in the EA/IS be changed to, "Use of transfer water for M&I uses will not occur until compliance with ESA/CESA has been confirmed with the Service/CDFG."

- 18 The EA/IS states, "For any deliveries to new M&I uses in excess of existing contract amounts, **Phase 2** would consist of consultation with the U.S. Fish and Wildlife Service (Service or USFWS) on impacts and mitigation for conversion of 3,000 AF (of the proposed 20,000 AF) to serve new proposed development ("Villages") within the San Luis Water District currently under discussion. In consideration of the Villages development schedule, it is anticipated that the Villages development will not call on the 3,000 AF until 2009 at the earliest, allowing Reclamation and the Service time to complete the Phase 2 environmental compliance including any San Joaquin kit fox mitigation requirements." With respect to M&I deliveries through the San Luis WD, the EA/IS should refer to the letter from Marvin McIntyre to Reclamation (dated 2005) as an applicant commitment for this project (Attachment C).

Recommendations

- 19 As a result of significant uncertainties of the proposed project with respect to groundwater degradation, subsidence, water quality, effects to Refuge water supplies and cumulative effects, the Service recommends that an EIS be completed for this project. This is consistent with recommendations in the SJVDIP Groundwater Management Technical Report (1999). Further, we recommend that Reclamation initiate consultation pursuant to section 7(a) of the ESA to ensure that the project, as described in the EA/IS does not adversely affect listed species or their habitats. Finally, we recommend the NEPA/CEQA analysis be revised to include the following:

- 20
1. The potential for degradation of the production wells, consistency of the proposed action with CVPIA Section 3405 a(1)(J), and any mitigation or contingency measures should well water become unusable for downstream uses;
 2. Contingency measures if subsidence as a result of this project exceeds .2 feet over 25-years;
 3. Mitigation measures or contingencies for water supplies obligated in agreements (Drainage Settlement Proposal) or M&I supplies (e.g., for the "Villages") in the event that the quantity of water available from groundwater pumping proposed in this project is reduced due to degradation of production wells;
 4. An adaptive management program that adjusts surface water deliveries and groundwater pumping rates to mitigate adverse consequences of groundwater degradation and protect

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 15

- downstream uses including refuge water supplies;
5. Monitoring of extracted water for selenium and mercury (total and methyl) at least monthly;
 6. Incorporation of the letter from SLWD to Reclamation (Attachment C) as an environmental commitment for this project; and,
 7. Revision of commitment language on land conversions: *Use of transfer water for M&I uses will not occur until compliance with ESA/CESA has been confirmed with the Service/CDFG.*

We appreciate the additional time provided by the SJECWA and Reclamation to allow the Service adequate time for review of the EA/IS. We look forward to working with you on this project. If you have any questions or concerns about these comments please contact Susan Jones or Joy Winckel of my staff at the letterhead address or at (916) 414-6600.

cc: Steve Chedester, SJECWA
Chris White, CCID
Jeff Bryant, FCWD
Julie Vance, CDFG
Gail Cismowski, CCVRQWCB
Laura Fuji, USEPA
Theresa Presser, USGS
Kim Forrest, USFWS San Luis National Wildlife Refuge Complex

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 19

Attachment A.



IN REPLY

REFER TO:

MP-410
WTR-4.03

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

MAY 18 2007

MEMORANDUM

To: U.S. Fish and Wildlife Service
Attn: Steve Thompson, California and Nevada Operations Manager

From: Kirk C. Rodgers
FOR Regional Director (sgd) John T. Doolittle

Subject: Responsibility for Return Flows and Drainage Pursuant to Memorandum of Understanding Nos. 01-WC-20-1757 and 01-WC-20-1758 (MOUs) for Water Supply to Various National Wildlife Refuges Between the Bureau of Reclamation and the U. S. Fish and Wildlife Service (Service) - Central Valley Project, California

Dear Mr. Thompson:

In recent years, there has been increased focus on water quality issues in the Central Valley and particularly on salinity problems in the San Joaquin River. Pursuant to the MOUs between Reclamation and the Service (Nos. 01-WC-20-1757 and 01-WC-20-1758), Central Valley Project (Project) water deliveries are made by Reclamation to certain National Wildlife Refuges (Refuges) in the Central Valley. Return flows from these Refuges have been identified as one contributor to the salinity problem in the San Joaquin River.

Pursuant to the terms and conditions of the MOUs, the responsibility for return flows and drainage from the Refuges receiving Project water is assigned to the Service without the creation of any obligation on the part of Reclamation to provide drainage services. As stated in Article 11(b), "The Service shall be responsible for compliance with all State of California and Federal water quality standards and directives applicable to surface return flows and subsurface agricultural drainage discharges generated within its boundaries arising from water conveyed to the Refuges pursuant to this MOU. This MOU does not create any obligation on Reclamation to provide drainage services."

If you have any questions, please call Mr. Richard Woodley, Regional Resources Manager, at 916-978-5201.

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 20

Attachment B.

Kesterson Unit, San Luis National Wildlife Refuge Complex, Source Water TDS Calculations

10,621 acres (www.fws.gov/sanluis/kesterson.htm)

March 2001, Water Year Type: Dry.

Base load allocation total: 25,000 (tons of salt, March, Dry Water Year)

For Kesterson: 25,000 tons * 10621/1210000 (Total allocation times proportion of Kesterson acres to "total nonpoint source acreage of the LSJR Basin")
= 25,000 tons * 0.00878 = 219.4 tons of salt

Supply water credit total: 15,900 (tons of salt, March, Dry Water Year)

For Kesterson: 15,900 tons * 0.00878 = 139.6 tons of salt (see above)

Consumptive Use Allowance: $L_{cua} = Q * 230 \text{ uS/cm} * 0.8293$

(CRWQCB-CVR Resolution No. R5-2004-0108, Attachment 1)

Delivered water (March 2001):

From Santa Fe Canal: 610 acre-feet

From San Luis Canal: 398 acre-feet

Total: 1,008 acre-feet or 1.008 taf (thousand acre-feet)

Average % increase in EC (delivered vs. discharged water, 2002, from amended Salt-Boron report): 11.7%

That is: $L_{out}/Q_{out} / L_{in}/Q_{in} = 1.117$

Where L is salt load and Q is quantity of water

If salt load is conserved then $S_{out} = S_{in}$

Therefore $Q_{out} = Q_{in} / 1.117$

If residence time of water is neglected (short compared to monthly resolution of data) then:

Discharged water, $Q_{out} = 1.008 \text{ taf} / 1.117 = 0.902 \text{ taf}$

Therefore Consumptive Use Allowance (see above, as clarified by Matthew McCarthy, pers. com.):

$L_{cua} = 0.902 \text{ taf} * 230 \text{ uS/cm} * 0.8293 \text{ (tons/taf)/(uS/cm)} = 172.0 \text{ tons of salt.}$

The allocation for Kesterson (March, Dry Year) would then be:

Allocation = base allocation + supply water credit + consumptive use allowance
= 219.4 tons + 139.6 tons + 172.0 tons = 531 tons of salt

This corresponds to salt concentration (as $\mu\text{S/cm EC}$) in discharged water:

$EC = L_{out}/(Q_{out} * 0.8293 \text{ (tons/taf)/(uS/cm)})$
= 531 tons / (0.902 taf * 0.8293 (tons/taf)/(uS/cm))
= 710 $\mu\text{S/cm}$

This corresponds to salt concentration (as $\mu\text{S/cm EC}$) in delivered water:

$EC = L_{in}/(Q_{in} * 0.8293 \text{ (tons/taf)/(uS/cm)})$
= 531 tons / (1.008 taf * 0.8293 (tons/taf)/(uS/cm))
= 635 $\mu\text{S/cm}$

Measured EC in delivered and discharged water in 2002 is shown in Figure 1.

Mr. Robert Eckart, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento 21

Attachment C.

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GARY W. SAWYERS
SCOTT D. GREENWOOD-MEINERT

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May 3, 2006

VIA FACSIMILE ONLY
(559) 487-5397

Ms. Kathy Wood
Chief, Resource Management Division
Bureau of Reclamation
South-Central California Area Office
1243 "N" Street
Fresno, CA 93721

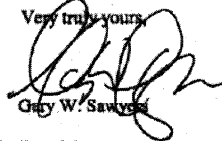
Re: San Luis Water District
Our File No. 52120.001

Dear Kathy:

In connection with the pending Agreement for the Acquisition of Water by the United States, San Luis & Delta-Mendota Water Authority, and Madera Irrigation District from the San Joaquin River Exchange Contractor Water Authority, I understand that Reclamation requires certain confirmations from the San Luis Water District. As you know, I am general counsel to the District. On behalf of the District, I hereby confirm that the District will not deliver Central Valley Project water to development or converted habitat without confirmation from the Bureau of Reclamation or other evidence that compliance with the Endangered Species Act has occurred with respect to the subject land either through Section 7 or Section 10 of the Act.

If you have any questions or need further confirmation, please contact me.

Very truly yours,



Gary W. Sawyers

GWS:lj
cc: Mr. Martin McIntyre (via facsimile only)
Mr. Daniel Nelson (via facsimile only)

RESPONSE

Michael B. Hoover:
August 27, 2007

Comment USFWS

1

The 10,000 AFY of the developed groundwater that will be exchanged with Westlands will be used to pay for drainage water treatment and disposal expenses. The additional quantity of water available for transfer (5,000 AF from wells and 5,000 AF from conservation), would be used to more directly fund the other capital costs of Westside Regional Drainage Plan including irrigation system improvements, distribution facility improvements, Grassland Bypass Project participation, and other miscellaneous in-district drainage costs. The plan expenditures in these categories in Firebaugh Canal Water District and in Camp 13 through the year 2014 is approximately \$42 million dollars.

The funding for implementation of the Exchange Contractors share of the WRDP is critical to the success of the program. This funding will be used for projects that are not eligible for funding under State grants or that the individual districts (Exchange Contractors) could assume on their own. In addition, the transferred water assures the payment for CCID/FCWD's share of the O&M on the treatment plant and half of the other O&M costs for the implementation of the WRDP. The groundwater pumping program has contained within it sufficient monitoring and reporting to protect the water users both within the Exchange Contractors' service area and adjacent to them.

2

The DMC sumps are under the control of and are operated by Reclamation, and the local districts have nothing to do with them.

3

Subsurface geologic conditions are important in evaluating the potential for downward flow of shallow groundwater. Besides the fine-grained Coast Range deposits, another confining bed is present in the eastern part of the project area, a clay layer normally about 70 feet deep. This clay also retards the downward flow of shallow groundwater into the underlying Sierran sands. Some evidence on the influence of pumping the deeper wells on the possible downward flow of poor quality shallow groundwater was provided by HydroFocus, and their 2003 pilot study report is provided herein as Attachment 2. Additional well data indicates that the downward flow of the aerobic, higher selenium groundwater is so slow that the selenium would be reduced (and thus non-detectable), once this groundwater was in the Sierran sands. See Response CVRWQCB-1.

4

The SJVDP for the Grasslands subarea recommended extraction of groundwater at a rate of 0.8 af/ac/yr. (8,000 AFY from 10,000 acres). The total extraction rate capacity was about

1.25 gallons per minute per acre. By comparison the pumping under the proposed program would have an extraction rate that is significantly less than those envisioned in the SJVDP. The program would have an extraction rate of 0.53 af/ac/yr, (15,000 AFY from 28,000 acres) with the extraction rate capacity of about 0.96 gallon per minute per acre. As a result the regional groundwater drawdown from the pumping and the possible groundwater degradation of the aquifer should be significantly less than what was modeled in the SJVDP.

5

The goals of the groundwater pumping, in addition to providing water for transfer to develop funding for capital improvement projects, are to reduce the elevation of shallow groundwater, to reduce the quantity of tile drainage produced in the area, and to intercept poor quality groundwater that is migrating north and northeast to the well fields located within CCID and Columbia Canal Company and other areas. The Exchange Contractors will be monitoring groundwater elevations and water quality within the existing network of multi-completion groundwater monitoring wells situated throughout the area. This network was installed in about 2000 for monitoring purposes. In addition water at the well head and blended water quality in the canal system will be monitored. These data will be analyzed and the pumping will be managed proactively and adaptively to accomplish all of the goals in the program, including minimizing or mitigating the potential for degradation of the production wells. The contingency for the instance where well water could become unusable for blending in the canal system is outlined in the EA/IS by making water available through conservation or fallowing if the well water is not available, either because of degradation or new regulatory constraints.

The individual districts will be monitoring for subsidence and water quality changes. If either gets outside of an acceptable range, they will reduce the pumping from existing wells, shift pumping to other project wells, cease pumping all together and implement the water transfer through the other methods identified in the EA/IS, specifically conserved water from a known saline sink or rotational land fallowing. The Districts are the first in line to experience any impacts due to this program, so they have a vesting interest in making sure the program operates within acceptable ranges set by their governing boards.

6

This is not the case. See Response 3 above and Response CVRWQCB – 1 for additional explanation. To minimize downward flow, even though we do not believe the flow would degrade aquifers used for well production, several additional measures could be used and have been incorporated into the Proposed Action.

First, the tops of the recovery well perforations would be placed below a depth of 150 feet (i.e., far below the base of the confining beds). The exact well design would be based on the results of electric logging, either a test hole or pilot hole prior to construction of each well. The wells are to be designed to tap lower salinity water in the profile below a depth of about 150 feet and above the Corcoran Clay, as opposed to shallower poor quality groundwater. Second, the proposed pumping rate is close to that of the projected lateral groundwater flow in these strata. This in itself would minimize the downward flow of shallow groundwater.

Third, groundwater monitoring using existing monitoring wells can be used to evaluate changes in downward flow.

7

It is recognized that the groundwater pumping program itself may not provide a long term supply for water due to the possibility of degradation, changes in standards for receiving water, and /or changes in water quality regulations. This program has mitigation built in as a primary program element. First, water would be made available from groundwater wells. Second, if well water is not available for any reason, then the water would be made available from conserved water or, as a last resort, by providing water through rotational fallowing of land as described in Sections 1.2 and 2.3 of the EA/IS. No water transfer agreements have been executed with either SLWD or WWD.

8

The Westside Regional Drainage Plan contains actions to be accomplished by all the entities within the Grasslands subarea and includes actions by Westlands Water District located immediately upslope. Many of the projects called out have already been accomplished. Westlands has installed significant irrigation system improvements, has purchased and retired Broadview Water District, and has retired the Sumner-Peck lands of approximately 42,000 acres. In addition, the plan calls for Westlands to install deep wells along their service area boundary to intercept flows and reduce pressures within the down slope area. They have also agreed to contribute to the cost of treating and disposing of the remaining drainage water extracted from the down slope area within the Exchange Contractors service area.

9

Our conclusion is that the impact is not significant, so mitigation under CEQA is not required. To see if our conclusion holds up over time, the individual districts will be monitoring for both subsidence and water quality changes. See Response 5.

10

The “extracted water” would be monitored as stated in Section 4.4.2.1, with a focus on EC and selenium. If constituents of the extracted water, in particular any occurrence of selenium, reach levels unacceptable for a blended supply, project operations would be adapted, e.g., pumping from alternative wells would be implemented or other “non-pumping” water development measures of conservation and/or land fallowing would be used.

11

Selenium is not a constituent that would be introduced into water deliveries from this project. Concerning other constituents, e.g., TDS, the project would not directly cause the CVP to exceed suitability objectives. Deliveries to users dependent upon affected facilities (owned and operated by the Exchange Contractors) would be geographically affected similarly. If

non-Exchange Contractors water users are affected, they would be affected no differently than the affected Exchange Contractors. The blended water resulting from the project would be suitable for irrigation purposes. The project does not run contrary to the directive of Section 3406(d) of the CVPIA.

12

Procedures and rules for the implementation of a TMDL in the San Joaquin River are not known at this time. Therefore, an effect upon the refuges or the Exchange Contractors themselves is speculative. The EA/IS illustrates that there would be no effect to the users that receive waters from the Main Canal upstream of O'Banion Bypass, including the refuges. There is noted in the EA/IS the potential of lesser water quality in the Main Canal below the O'Banion Bypass due to an assumed routing of water from the Outside Canal to the Main Canal, a routing that can be controlled by the project operator. The slight extent of water quality degradation to the refuge supplies due to the project would be dependent upon project operation and many other factors affecting the refuge supplies, including the route of conveyance used by the refuges to receive their supplies, which at times is dependent upon Exchange Contractor facilities. If there is a project-related effect upon the refuges' ability to achieve standards in the future, the project effect, if any, would not be the sole cause or even a major cause of not achieving the standards.

13

The point that the incremental small water quality effect could cumulatively be a problem and trigger the Grassland wildlife refuges to exceed the TMDL for salt is not a significant impact that would cause preparation of an EIR when evaluated against other activities in the watershed. The salt problem in the refuges has multiple sources as noted in Response 12 above. The focus in an initial study is the project's incremental impact, not on the existence of potentially significant cumulative impacts caused by other projects alone. The need for an EIR turns on the impacts of the project under review, not the impacts of other past, present, or future projects.¹ While past and present projects will need to meet current salt TMDLs, reasonably foreseeable plans and projects on the San Joaquin River point to improved water quality (Grassland Bypass Project, San Joaquin River Restoration, potential Basin Plan amendments) over time. The indirect localized incremental effect to the Grasslands refuges caused by delivery of the blended water to CCID using the Outside Canal is further offset by reductions in poor quality drainage that would otherwise be discharged as part of the Grassland Bypass Project to Mud Slough which is under study for an extension of time to meet selenium and salt load requirements.

14

Se is not a problem from the wells pumping into the system. The testing we have done on the wells that are in operation show Non Detection (<2ppb) selenium. The last samples were

¹ Remy et al, Guide to CEQA, Appendix III, New and Improved CEQA Guidelines Revisions, page 1089, February 2007.

taken on 8/24/07, and analysis was performed by BSK. (The Del Rey Well has been abandoned and will not be used because of overall salt levels).

15

Any of monitoring of tile sumps within the drainage area is subject to monitoring in connection with the Use Agreement for the San Luis Drain and the San Joaquin River Water Quality Improvement Project reuse area.

16

The statement that this project could violate Sections 3405(a) (I)(J) is not accurate.

CVPIA, Section 3405(a) (I) The water subject to any transfer undertaken pursuant to this subsection shall be limited to water that would have been consumptively used or irretrievably lost to beneficial use during the year or years of the transfer.

The water made available under the Exchange Contractors 25-year EA meets the provisions of 3405(a) (I) as deemed to meet the consumptive use criteria or beneficial uses criteria as provided for under Reclamations Interim Guidelines for the Implementation of Water Transfer Under Title XXXIV of Public Law 102-575 (Water Transfers).

CVPIA, Section 3405(a) (J) The Secretary shall not approve a transfer authorized by this subsection unless the Secretary determines, consistent with paragraph 3405(a)(2) of this title, that such transfer will have no significant long term adverse impact on groundwater conditions in the transferor's service area. This provision of CVPIA sunset September 20, 1999. "(3) Transfers executed after September 30, 1999 shall only be governed by the provisions of subparagraphs 3405(a)(1)(A) (C), (E), (G), (H), (I), (L), and (M) of this title, and by State law."

17

The EA/IS does consider the incremental impacts of the project on surface and groundwater resources (see Section 4.9.4) and determined that the impacts were not significant. The 1998 revised CEQA Guidelines (Section 15064, subd. (h)(4)) state that "[t]he mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's effects are cumulatively considerable". As stated above in Response 13, the focus in an initial study is on the project's incremental effects where other past, present, and reasonably foreseeable projects provide context for the discussion. For groundwater, the small incremental effects of localized downward migration of poor quality groundwater are offset by the benefits of reducing the migration of poor quality groundwater into CCID and Madera County. See also Response CVRWQCB-1 on the downward migration issue.

For surface water, the incremental impacts of barely perceptible changes in salt in blended supplies in the Main Canal, which could affect deliveries to the refuges, is minor. The project would also result in a reduction in drainage discharges to Mud Slough under the Grassland

Bypass Project. *The discussion of the Grassland Bypass Project in Section 1.3.3 has been updated to include the potential extension of that project past 2009.*

The EA/IS identifies that there is no direct hydraulic continuity between the project and the San Joaquin River; therefore, there would be no resulting change in flow in the San Joaquin River. There would also be not substantive, if any, change in water quality in the San Joaquin River due to Exchange Contractor return flows to the San Joaquin River, since the lands being affected by the project have little if no hydraulic continuity with the San Joaquin River. The slight effect to other uses that may be affected by the project and resulting effects (see Response 12 above) have been considered and determined to be not significant and beyond the responsibility of the project (i.e., part of the context in which the project occurs).

18

With one exception, the potential water purchasers would be using the water to meet supply shortages. The frequency of these shortages is shown in Table 2.2-2 of the EA/IS. The districts have commitments to provide water service to existing agricultural and M&I users that cannot be met in all years. In order to receive transfer approval from Reclamation (the Phase 1 approval explained in Section 2.4 and clarified below), the Exchange Contractors would have to provide documentation from the potential user that the water would be used for existing land uses. Enforcement rests with Reclamation, and the Exchange Contractors would ensure that any agreements to sell water would have the required commitment from the water purchaser. See the letter from Gary W. Sawyers, general counsel to the San Luis Water District, to Reclamation's Kathy Wood provided as Attachment C of your comment letter where the district commits to not delivering CVP water to development or converted habitat without confirmation from Reclamation or other evidence that compliance with ESA has occurred.

“Use of transfer water for M&I uses would not occur until full compliance with ESA/CESA has been accomplished unless the water purchasers within the SLWD or SCWD have determined that such conversion would not likely affect listed species or that appropriate mitigation has been provided, in consultation with Reclamation and the Service.” is hereby changed to “Use of transfer water for new M&I uses will not occur until (1) compliance with CESA and with CEQA, including analysis and mitigation for other sensitive biological resources, has been confirmed with the DFG and (2) ESA compliance for such M&I uses has been demonstrated by one of the following methods:”

- A. A letter or memo from the Service stating that the use will not result in adverse effects on listed or proposed species or proposed or designated critical habitat.
- B. An incidental take permit for the M&I use issued by the Service pursuant to section 10(a)(1)(B) of the ESA.
- C. A non-jeopardy, non-adverse modification or destruction biological opinion, or a biological opinion with a reasonable and prudent alternative, or a memo/letter concurring with a “not likely to adversely affect” determination issued by the Service to the lead Federal agency having jurisdiction over the project(s) using the transferred water for M&I use.

- D. A properly documented “no effect” determination made by the Federal agency(ies) having jurisdiction over the project(s) using the transferred water for M&I use. Commitment 8 on page 2-70 of the CVPIA Programmatic Biological Opinion requires Reclamation to “provide necessary information to the Service’s SFWO Endangered Species Division” on CVP actions “where a determination of no effect has been made, sufficiently in advance, to enable the Service’s review”. Reclamation would accomplish this via the current SCCAO practice of immediately notifying Service of the availability of NEPA documents for public review and comment.

Because any significant impacts from M&I use would be mitigated by the M&I projects before a water transfer is approved and water is actually provided, the proposed project has no significant impacts on the environment that are related to such transfers.

19

After careful consideration of your comments and all other comments received by August 27, 2007, and given that the needed changes to the EA/IS are primarily for clarification purposes and no new significant impacts have been determined, the lead agencies’ staff do not believe an EIR or EIS is required. Staff will recommend to the decisionmakers that a MND and FONSI are appropriate. Much is known about surface water and groundwater resources in the project area, and the proposed monitoring provides assurances that timely, relevant information will continue to be developed and evaluated over the life of the project.

Reclamation has determined that Phase 1 will not result in effects on Federally listed or proposed species or proposed or designated critical habitat. Reclamation has further addressed the Service’s comments under Response 18 above. Therefore, no consultation with the Service on transfers under Phase 1 is required. As previously discussed with the Service, Reclamation will formally consult with the Service on Phase 2 transfers.

20

1. The potential for degradation of the production wells is addressed in Responses 2, 3, 4, 5, and 6 and CVRWQCB-1. Clarifying text has been added to the groundwater quality Subsection 4.4.2.1 and to the description of the Action Alternatives (Section 2.3) on well design and monitoring.
2. See Responses 5 and 9.
3. Should groundwater pumping need to be reduced for any reason, the other alternatives of developing water from conservation and/or rotational land fallowing would be employed. See response 10.
4. See Response 10.
5. See Responses 14 and 15.
6. Your Attachment C is incorporated as an environmental commitment and referenced in Section 2.4.

7. The commitment language has been revised as suggested in Section 2.4 of the Final EA/IS.

08-06-07

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FROM:DFG

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DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>
Central Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4005



August 6, 2007

Steve Chedester
San Joaquin River Exchange Contractors
Water Authority
Post Office Box 2115
Los Banos, California 93635

Dear Mr. Chedester:

**Groundwater Pumping/Water Transfer Project for 25 Consecutive Years
Environmental Assessment (EA) / Initial Study (IS) and Mitigated Negative
Declaration (MND) / Finding of No Significant impacts (FONSI)
SCH No. 2007072012**

The Department of Fish and Game (Department) has reviewed the EA/IS and MND/FONSI submitted by the San Joaquin River Exchange Contractors for the above Project. The purpose of the Project is to develop a water supply for transfer of up to 20,000 acre feet (AF) annually that will assist in alleviating water supply shortages to the Central Valley Project (CVP) San Luis Unit agriculture service contractors and local CVP municipal and industrial uses in San Luis and Santa Clara Valley Water Districts. The transfer will also provide capital improvement funding to control drainwater production in areas affected by shallow groundwater. The primary source of this transfer water is groundwater pumping. The transfer would allow for execution by the Exchange Contractors of long-term agreements with certain CVP contractors in the CVP San Luis Unit and San Felipe Division.

The Department is concerned that the EA/IS and MND/FONSI do not address the growth-inducing impacts as a result of the Phase 2 use of 3,000 AF of transferred water to support the proposed Villages of Laguna San Luis Community Plan residential development. The State threatened and Federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*), the State threatened Swainson's hawk (*Buteo swainsoni*), the Federally threatened and State Species of Concern California red-legged frog (*Rana aurora draytonii*) and California tiger salamander (*Ambystoma californiense*) and the State Species of Concern burrowing owl (*Athene cunicularia*) are known to occur in the Villages area and potential impacts to these species as a result of the water transfer and subsequent development should be presented in the California Environmental Quality Act (CEQA) document prepared for this Project. Our specific comments follow.

Trustee Agency Authority: The Department is a Trustee Agency with the responsibility under CEQA for commenting on projects that could impact plant and

Conserving California's Wildlife Since 1870

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wildlife resources. Pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. As a Trustee Agency for fish and wildlife resources, the Department is responsible for providing, as available, biological expertise to review and comment on environmental documents and impacts arising from project activities as those terms are used under CEQA.

Responsible Agency Authority: The Department has regulatory authority over projects that could result in the "take" of any species listed by the State as threatened or endangered pursuant to Fish and Game Code Section 2081. If the Project could result in the "take" of any species listed as threatened or endangered under the California Endangered Species Act (CESA), the Department may need to issue an Incidental Take Permit for the Project. CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species (Sections 21001(c), 21083, Guidelines Sections 15380, 15064, 15065). Impacts must be avoided or mitigated to less than significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code Section 2080.

Unlisted Species: Species of plants and animals need not be officially listed as Endangered, Rare, or Threatened (E, R, or T) on any State or Federal list to be considered E, R, or T under CEQA. If a species can be shown to meet the criteria for E, R, or T as specified in the CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, and Section 15380), it should be fully considered in the environmental analysis for the Project.

CEQA Compliance

- 2 **Phase 2 Water Delivery and Residential Development:** Regardless of the fact that the Project is separated into two phases, each phase is a part of the entire 20,000 AF water transfer Project and the potential impacts of the Project (Phases 1 and 2) should be addressed in the CEQA document prepared.

- 3 The CEQA Checklist for Socioeconomics (Section 4.6.2.3 page 4-66) states that the Project will not induce substantial population growth in the Project area either directly or indirectly. The Department disagrees with this determination. As stated in the EA/IS and MND/FONSI, Phase 2 of this Project will involve the transfer of 3,000 AF to the proposed Villages of Laguna San Luis Community Plan (Villages) residential development in the San Luis Water District. The Villages development includes

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6,214 acres west of Interstate 5 along State Routes 33 and 152 in western Merced County in the unincorporated village of Santa Nella. The proposed Villages plan includes a projected net development and conversion of approximately 4,259 acres of grassland and nonirrigated farmland to residential, commercial, and light industrial use. As the Villages development will be dependent on the 3,000 AF of water that will result from the Project and will substantially increase the human population of the area, the CEQA document should address the growth-inducing impacts of the water delivery.

4 In addition to the growth-inducing impacts related to the Project, potential impacts to species listed under CESA should also be addressed. The EA/IS and MND/FONSI state that Phase 2 will consist of consultation with the United States Fish and Wildlife Service (USFWS) on impacts and mitigation for conversion of 3,000 AF to serve the Villages. The Department should also be consulted for impacts that will occur to species listed under CESA and the need for Incidental Take Permits under Fish and Game Code Section 2081.

5 The CEQA document should include a discussion of all possible significant impacts as a result of Project implementation. Currently, the EA/IS and MND/FONSI state only that the USFWS will be consulted on impacts and mitigation as a result of the Villages development. While the Department concurs with the need to consult with the USFWS and the Department on impacts and mitigation measures, these impacts and proposed mitigation measures should be presented in the CEQA document prepared for this Project. As currently presented in the EA/IS and MND/FONSI, the significant environmental impacts that will occur as a result of Project implementation are not mitigated to a less than significant level, and a MND would not be appropriate. Further, when a MND is prepared, mitigation measures must be specific and clearly defined and cannot be deferred to a future time. The specifics of mitigation measures may be deferred, provided the Lead Agency commits to mitigation and establishes performance standards for implementation, when an Environmental Impact Report (EIR) is prepared. If the Lead Agency feels that a MND is appropriate for this Project, the MND should present the specific mitigation measures that will be implemented; otherwise, an EIR is required. Regardless of whether a MND or EIR is prepared, the CEQA document must provide measurable mitigation measures that will reduce impacts to less than significant levels.

General Comments

6 The EA/IS and MND/FONSI state that agricultural or other undeveloped, nonurban lands would not be converted to urban uses as a result of the water transfer. It is unclear how this requirement will be enforced over the 25-year Project timeline and what agency or group will enforce it. It is also unclear what the consequences of land

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conversion are on the water supply to that land. With the current rate of residential development in the Project area, there is a high likelihood that land currently in agriculture or otherwise undeveloped whose water will be supplied by this Project will be converted to residential or other land uses. In these cases, would the water supply that would result from this Project be removed from the land in question? This issue should be addressed in the CEQA document prepared for this Project.

Potential Project Impacts

7 On February 11, 2005, the Department commented on the Notice of Preparation for the Villages prepared by the County of Merced. That comment letter documented potential Project-related impacts to species listed under CESA, Department managed lands and the Agua Fria mitigation bank as a result of the Villages development. As previously stated, because the Villages is dependent on the transfer of 3,000 AF of water that will occur as a result of the current Project, the CEQA document should address impacts that will result from the Villages development. A summary of potential impacts to CESA-listed species, Department managed lands and the Agua Fria mitigation bank, as presented in the February 11, 2005, letter follows.

San Joaquin Kit Fox (SJKF): Upland habitat in the area that could serve as movement or rest areas for SJKF has very high conservation value for the species. Implementation of the proposed Villages Project, in conjunction with other developments planned in the Santa Nella area, could result in permanent fragmentation of the north-south migratory corridor of the SJKF and would eliminate most of the remaining open space that could be used for denning, resting, and foraging habitat, as well as any viable movement corridors. The CEQA document should address the impacts to SJKF in the area.

Swainson's Hawk: Swainson's hawks nest in the nearby O'Neill Forebay Wildlife Area. Development of the Villages Project, in conjunction with other development planned in the Santa Nella area, would remove most of the foraging habitat surrounding this nesting area and may make the nest sites no longer viable. The CEQA document should quantify and describe the potential impacts to Swainson's Hawk.

Wildlife Areas and Conservation Lands: The Villages Project will result in direct and indirect Project-related impacts to the Agua Fria mitigation bank, the Jasper Sears mitigation parcel, and the O'Neill Forebay Wildlife Area.

The O'Neill Forebay Wildlife Area (OFWA) was established as mitigation for impacts to riparian habitat resulting from creation of the San Luis Unit of the State Water Project (SWP) and the Federal Central Valley Project (CVP). Because the development

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planned for the Santa Nella area will result in urban areas surrounding the OFWA on three sides, the wildlife and public use values of the OFWA will be lost because of direct and indirect impacts from heavy human use, feral and domestic animals, increased lighting and noise, traffic, etc., which would make the wildlife values in the OFWA comparable to those of an urban park. The potential loss of the ability of OFWA to protect and enhance habitat for wildlife species, and to provide the public with wildlife-related recreational uses such as hunting, fishing, and wildlife viewing as a result of urban encroachment should be addressed in the CEQA document.

If you have questions regarding these comments, please contact Justin Sloan, Environmental Scientist, at the address provided on this letterhead or by telephone at (559) 243-4014, extension 216.

Sincerely,


W. E. Loudermilk
Regional Manager

cc: See Page Six

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Steve Chedester
August 6, 2007
Page 6

cc: State Clearinghouse
Office of Planning and Research
1400 Tenth Street
Sacramento, California 95812-3044

Maryann Owens
United States Fish and
Wildlife Service
2800 Cottage Way, W-2605
Sacramento, California 95825

Joy Winkle
United States Fish and
Wildlife Service
2800 Cottage Way, W-2605
Sacramento, California 95825

Bob Eckart
United States Department
of the Interior
Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825

Department of Fish and Game
John Beam
William Cook Jr.

RESPONSE**Dale Mitchell for W.E. Loudermilk:
August 6, 2007****Comment DFG****1**

This introductory comment is more fully addressed in Responses 2 and 3 below. The Draft EA/IS and the proposed MND/FONSI address the potential for a growth-inducing impact of indirectly facilitating new development with the provision of transfer water by avoiding the impact with the Phase 2 transfer approval process which is clarified below.

The MND and FONSI cover all of the water development activity and the use of the water in the receiving areas for existing uses (Phase 1 approval); they do not cover “new” uses for Phase 2 approval. Reclamation will address the impacts for Phase 2 with separate NEPA and ESA compliance. The NEPA document will address impacts on non-Federally-listed special status species, as well as for those species that are listed under the ESA. This includes State-listed species, State Species of Special Concern, and any other sensitive native species that may be affected (e.g. the tule elk). Reclamation intends to incorporate conservation measures for all species under DFG’s and Service’s jurisdiction into the project description of the separate NEPA document and biological assessment for Phase 2 water transfer projects. These measures should not be finalized until the DFG, Service and Reclamation-supported facilitated discussions and a regional conservation strategy for the San Joaquin kit fox are completed. Reclamation will continue to encourage the County of Merced and the proponents of the Villages of Laguna San Luis Community Plan to participate in this facilitated process.

2

The phases of the project are more clearly defined as phases of project approval where one option for water use, specifically 3,000 AFY, cannot be approved until all of the necessary environmental compliance actions, including full analysis of impacts, is completed. The current MND and FONSI (and attached EA/IS) address water development of 20,000 AFY and use of the developed water in the receiving areas with the exceptions for “new uses” (either agricultural or M&I) called out in Section 5 of the MND and Section 2.4 of the EA/IS. The potential for 3,000 AFY being transferred to the San Luis Water District for new M&I uses is clearly stated, and the analysis of those impacts would be accomplished with separate documents and consultations. It is impractical for a water transfer document prepared by a water authority and Reclamation to cover specific land use development projects in detail as requested in your comment, especially when the environmental document for the proposed Villages of Laguna San Luis Community Plan was being developed by the appropriate lead agency, Merced County, and was released for public review after the water transfer document and prior to close of the comments period for the water transfer MND/FONSI. Consequently, the extent of the potential water receiving areas and types of users was limited in the Project Description of the EA/IS. Furthermore, appropriate mitigation for growth inducement can best be implemented by the land use planning agencies responsible for

approving land development projects such as the Villages and regulating the subdivision of land and type/intensity of use.

3

The water transfer project would not induce substantial population growth because the type of action that would potentially induce growth has been explicitly excluded from the approval process in the short term. The water transfer project anticipates a future phase of the project where additional CEQA/NEPA and CESA/ESA compliance would be accomplished by the water transfer lead agencies and the city/county land use authority involved for the Villages or for any other “new” use of M&I water that may come forward. In the short term, agreements to sell water are limited to water for existing uses, and the potential for growth inducement is avoided. Meanwhile, the CEQA process for evaluating the impacts of the Villages project is underway, and your comments on that project are noted. It should be pointed out that the water needs assessment for that project identified several sources of water supply.

4

As stated in the response to USFWS 18 the text of the EA/IS has been modified in Sections 2.4 and 4.2.2.2 as follows:

“Use of transfer water for M&I uses would not occur until full compliance with ESA/CESA has been accomplished unless the water purchasers within the SLWD or SCWD have determined that such conversion would not likely affect listed species or that appropriate mitigation has been provided, in consultation with Reclamation and the Service.” is hereby changed to “Use of transfer water for new M&I uses will not occur until (1) compliance with CESA and with CEQA, including analysis and mitigation for other sensitive biological resources, has been confirmed with the DFG and (2) ESA compliance for such M&I uses has been demonstrated by one of the following methods:”

- A. A letter or memo from the Service stating that the use will not result in adverse effects on listed or proposed species or proposed or designated critical habitat.
- B. An incidental take permit for the M&I use issued by the Service pursuant to section 10(a)(1)(B) of the ESA.
- C. A non-jeopardy, non-adverse modification or destruction biological opinion, or a biological opinion with a reasonable and prudent alternative, or a memo/letter concurring with a “not likely to adversely affect” determination issued by the Service to the lead Federal agency having jurisdiction over the project(s) using the transferred water for M&I use.
- D. A properly documented “no effect” determination made by the Federal agency(ies) having jurisdiction over the project(s) using the transferred water for M&I use. Commitment 8 on page 2-70 of the CVPIA Programmatic Biological Opinion requires Reclamation to “provide necessary information to the Service’s SFWO Endangered Species Division” on CVP actions “where a determination of no effect has been made, sufficiently in advance, to enable the Service’s review”. Reclamation

would accomplish this via the current SCCAO practice of immediately notifying Service of the availability of NEPA documents for public review and comment.

Because any significant impacts from M&I use would be mitigated by the M&I projects before a water transfer is approved and water is actually provided, the proposed groundwater pumping/water transfer project has no significant impacts on the environment that are related to such transfers.

5

As stated under Response 1 above, the MND and FONSI do not address Phase 2 transfers. Reclamation intends to incorporate DFG- and Service-approved conservation measures that must be implemented by water recipients into the project description for the NEPA document and biological assessment for Phase 2. Phase 2 cannot be analyzed at this time, as the project description is not yet complete. As clarified in the Responses USFWS 18 and DFG 4, water transfers to new uses would not occur until DFG and USFWS have confirmed either that there are no adverse effects from an M&I project applying for a water transfer or that all mitigations for impacts to biological resources that are required of the M&I project by the agencies implementing the CEQA document and any Biological Opinion, federal, state, and local permit have been completed.

The MND identifies all mitigation required as well as voluntary mitigation and monitoring proposed for the water development and transfer activities. Agreements for and approval of transfers for new uses, in particular the Villages project, by the Exchange Contractors and Reclamation will not occur until additional CEQA/NEPA and CESA/ESA compliance is achieved to the satisfaction of all parties. Mitigation requirements for the Villages will not be the responsibility of the Exchange Contractors and Reclamation but rather the responsibility of the project proponents, the SLWD, and Merced County.

6

Reclamation does not have land use authority, however, water districts have committed that they will not deliver project water to urban development without the appropriate ESA and environmental review. See Attachment C from Gary Sawyers on behalf of SLWD to the USFWS comment letter.

The project purpose and need are clearly stated, including the need to water supplies to meet shortages experienced by existing water users (for up to 25 years) for Phase 1 water transfers, and supplemental analysis will be required for any new uses as Phase 2 water transfers. We are not prepared to speculate on the conversion of land to other uses, either as to when this would occur or where within the receiving areas. We defer to the city and county general plans to direct growth and the conversion of undeveloped land to new uses. Once an agreement with a specific user is executed and terms are established about how the water is to be used, following CVP water transfer approval from Reclamation, any subsequent changes could require a modification to the agreement; and the need for additional CEQA/NEPA and CES/ESA compliance for those changes would be identified.

7

As stated under Responses 1 and 5 above, Reclamation will fully address impacts to special-status species and their habitats in the future NEPA document and biological assessment for Phase 2. Reclamation is aware of the biological issues surrounding the Villages of Laguna San Luis Community Plan. Reclamation has participated in meetings with the DFG, Service and project proponents, has read the Draft Environmental Impact Report for the Villages of Laguna San Luis Community, Plan and has read the DFG's and Service's comments on that document, and is closely involved in many other currently planned Santa Nella area projects. Reclamation will continue to cooperate with the DFG through the facilitated kit fox discussions/regional conservation strategy and engage in coordinated efforts between the DFG and Service on individual projects, including the Villages of Laguna San Luis Community Plan.

STATE OF CALIFORNIA - THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 942390001
(916) 653-5791



RECEIVED

JUL 23 2007

S.J.R.E.C.W.A.

July 18, 2007

Joann Toscano
San Joaquin River Exchange Contractors Water Authority
541 H Street
Merced, California 93635

Groundwater Pumping/Water Transfer Project
State Clearinghouse (SCH) Number: 2007072012

1

The project corresponding to the subject SCH identification number has come to our attention. The limited project description suggests your project may be an encroachment on the State Adopted Plan of Flood Control. You may refer to the California Code of Regulations, Title 23 and Designated Floodway maps at <http://recbd.ca.gov/>. Please be advised that your county office also has copies of the Board's designated floodways for your review. If indeed your project encroaches on an adopted food control plan, you will need to obtain an encroachment permit from the Reclamation Board prior to initiating any activities. The attached Fact Sheet explains the permitting process. Please note that the permitting process may take as much as 45 to 60 days to process. Also note that a condition of the permit requires the securing all of the appropriate additional permits before initiating work. This information is provided so that you may plan accordingly.

If after careful evaluation, it is your assessment that your project is not within the authority of the Reclamation Board, you may disregard this notice. For further information, please contact me at (916) 574-1249.

Sincerely,

A handwritten signature in black ink, appearing to read 'CH Huitt'.

Christopher Huitt
Staff Environmental Scientist
Floodway Protection Section

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, CA 95814

Encroachment Permits Fact Sheet

Basis for Authority

State law (Water Code Sections 8534, 8608, 8609, and 8710 – 8723) tasks the Reclamation Board with enforcing appropriate standards for the construction, maintenance, and protection of adopted flood control plans. Regulations implementing these directives are found in California Code of Regulations (CCR) Title 23, Division 1.

Area of Reclamation Board Jurisdiction

The adopted plan of flood control under the jurisdiction and authority of the Reclamation Board includes the Sacramento and San Joaquin Rivers and their tributaries and distributaries and the designated floodways.

Streams regulated by the Reclamation Board can be found in Title 23 Section 112. Information on designated floodways can be found on the Reclamation Board's website at http://recbd.ca.gov/designated_floodway/ and CCR Title 23 Sections 101 - 107.

Regulatory Process

The Reclamation Board ensures the integrity of the flood control system through a permit process (Water Code Section 8710). A permit must be obtained prior to initiating any activity, including excavation and construction, removal or planting of landscaping within floodways, levees, and 10 feet landward of the landside levee toes. Additionally, activities located outside of the adopted plan of flood control but which may foreseeable interfere with the functioning or operation of the plan of flood control is also subject to a permit of the Reclamation Board.

Details regarding the permitting process and the regulations can be found on the Reclamation Board's website at <http://recbd.ca.gov/> under "Frequently Asked Questions" and "Regulations," respectively. The application form and the accompanying environmental questionnaire can be found on the Reclamation Board's website at <http://recbd.ca.gov/forms.cfm>.

Application Review Process

Applications when deemed complete will undergo technical and environmental review by Reclamation Board and/or Department of Water Resources staff.

Technical Review

A technical review is conducted of the application to ensure consistency with the regulatory standards designed to ensure the function and structural integrity of the adopted plan of flood control for the protection of public welfare and safety. Standards and permitted uses of designated floodways are found in CCR Title 23 Sections 107 and Article 8 (Sections 111 to 137). The permit contains 12 standard conditions and additional special conditions may be placed on the permit as the situation warrants. Special conditions, for example, may include mitigation for the hydraulic impacts of the project by reducing or eliminating the additional flood risk to third parties that may caused by the project.

Additional information may be requested in support of the technical review of

your application pursuant to CCR Title 23 Section 8(b)(4). This information may include but not limited to geotechnical exploration, soil testing, hydraulic or sediment transport studies, and other analyses may be required at any time prior to a determination on the application.

Environmental Review

A determination on an encroachment application is a discretionary action by the Reclamation Board and its staff and subject to the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq.). Additional environmental considerations are placed on the issuance of the encroachment permit by Water Code Section 8608 and the corresponding implementing regulations (California Code of Regulations – CCR Title 23 Sections 10 and 16).

In most cases, the Reclamation Board will be assuming the role of a "responsible agency" within the meaning of CEQA. In these situations, the application must include a certified CEQA document by the "lead agency" [CCR Title 23 Section 8(b)(2)]. We emphasize that such a document must include within its project description and environmental assessment of the activities for which are being considered under the permit.

Encroachment applications will also undergo a review by an interagency Environmental Review Committee (ERC) pursuant to CCR Title 23 Section 10. Review of your application will be facilitated by providing as much additional environmental information as pertinent and available to the applicant at the time of submission of the encroachment application.

These additional documentations may include the following documentation:

- California Department of Fish and Game Streambed Alteration Notification (<http://www.dfg.ca.gov/1600/>),
- Clean Water Act Section 404 applications, and Rivers and Harbors Section 10 application (US Army Corp of Engineers),
- Clean Water Act Section 401 Water Quality Certification, and
- corresponding determinations by the respective regulatory agencies to the aforementioned applications, including Biological Opinions, if available at the time of submission of your application.

The submission of this information, if pertinent to your application, will expedite review and prevent overlapping requirements. This information should be made available as a supplement to your application as it becomes available. Transmittal information should reference the application number provided by the Reclamation Board.

In some limited situations, such as for minor projects, there may be no other agency with approval authority over the project, other than the encroachment permit by Reclamation Board. In these limited instances, the Reclamation Board

may choose to serve as the "lead agency" within the meaning of CEQA and in most cases the projects are of such a nature that a categorical or statutory exemption will apply. The Reclamation Board cannot invest staff resources to prepare complex environmental documentation.

Additional information may be requested in support of the environmental review of your application pursuant to CCR Title 23 Section 8(b)(4). This information may include biological surveys or other environmental surveys and may be required at anytime prior to a determination on the application.

RESPONSE

**Christopher Huitt:
July 23, 2007**

Comment DWR

1

The project does not encroach into any adopted flood control areas.



**California Regional Water Quality Control Board
Central Valley Region**

Karl E. Longley, ScD, P.E., Chair

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11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
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<http://www.waterboards.ca.gov/centralvalley>



6 August 2007

Mr. Bob Eckart,
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way
Sacramento, CA 95825

**COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSEMENT AND
INITIAL STUDY FOR THE 25-YEAR WATER TRANSFER PROJECT FOR
THE SAN JOAQUIN RIVER EXCHANGE CONTRACTORS WATER
AUTHORITY**

Thank you for the opportunity to comment on the Environmental Assessment and Initial Study for the 25-year Water Transfer Project for the San Joaquin River Exchanges Contractors Water Authority dated 3 July 2007. Staff has a number of concerns with the proposed alternative in light of the state anti-degradation policy (Resolution 68-16) and long-term salinity management in the area. Therefore staff supports implementation of the without-pumping alternative.

1 **The project does not adequately consider groundwater quality degradation.** Section 3.4.1.5 describes how the aquifer characteristics change with depth. Pumping from this aquifer (above the Corcoran clay) will likely result in drawdown of the water currently near the surface, causing additional salts and other materials currently present at shallower depths to migrate deeper. If this is the case, mitigation measures should be evaluated and implemented where feasible. At the very least, if this alternative is implemented, monitoring wells should be used to track both vertical and horizontal migration of constituents of concern (salts, selenium, others?) in the groundwater table.

2 **The proposed alternative will increase salinity in the aquifer.** Standard irrigated agricultural practices associated with the importation of Central Valley Project water result in an increase in the load of salts in the valley. Impacts of the salt load are exacerbated by the lack of a salt balance in the San Joaquin Valley, as there is currently a net gain of salts in the valley that is currently unsustainable in all long-term scenarios. The proposed alternative compounds the problem by reapplying salts from pumped groundwater. Until there is a feasible method of salt collection, storage and disposal in the area, the project proponents should avoid actions that make the problem worse.

✓ Since salt collection, storage and disposal is a long-standing issue in the

California Environmental Protection Agency



Bob Eckhart
USBR

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6 August 2007

Y area, project proponents should actively pursue a local solution to their problem and join in the effort to fund, develop and implement a Central Valley salinity management plan.

3 **The proposed alternative will result in water users receiving a lower quality water supply.** The report makes no mention as to whether the water users in the area are willing to accept water of lower quality for the duration of the project. According to Tables 10 and 12, Appendix D salts will increase in delivered water under the proposed alternative to levels where cropping choices will be affected. It is possible that some water users may find this a more acceptable alternative to rotational fallowing, but the report fails to identify which alternative is favored by those whose water quality will be impacted first by implementation of the project. The model in Appendix D assumes an electrical conductivity of 3,200 $\mu\text{mhos/cm}$ in the well water, but the three wells referenced in Appendix A have electrical conductivity of 3,745 $\mu\text{mhos/cm}$, 6,400 $\mu\text{mhos/cm}$, and 7,100 $\mu\text{mhos/cm}$ for an average of about 5,750 $\mu\text{mhos/cm}$. The analysis in Appendix D should reflect the information presented in Appendix A.

4 **The analysis does not adequately address potential impacts of the proposed alternative on salinity in the San Joaquin River.** The San Joaquin River is listed as "water quality limited" under Section 303(d) of the Clean Water Act for multiple constituents of concern including selenium, electrical conductivity (salt), and boron. Pursuant to Section 303(d) of the Clean Water Act, the Regional Board has adopted a Total Maximum Daily Load (TMDL) for salinity and boron in the San Joaquin River based on water quality objectives at the south Delta boundary (Vernalis). The peer-reviewed analysis supporting the TMDL report identifies groundwater as providing 4% of the overall flow draining the lower San Joaquin River watershed at an average concentration of 1,600 mg/L (approx 2,600 $\mu\text{mhos/cm}$), contributing 30% of the overall salt load. As a result of this TMDL, the Regional Board's Basin Plan contains load allocations for non-point sources of salt and boron loading to the lower San Joaquin River, including U.S. Bureau of Reclamation discharges to the river. In addition, the Regional Board is developing water quality objectives for salt and boron upstream of Vernalis, including the reach of the lower San Joaquin River that will be impacted by the proposed project. Mitigation must be proposed to offset any additional salt, boron, and selenium loading that will result from the proposed project. Since impacts may not be immediately evident, monitoring should be conducted over the life of the project to ensure that degradation can be averted

Bob Eckhart
USBR

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6 August 2007

- 5 | **The cumulative impact analysis is inadequate.** The EIS must evaluate the impact of incremental increases in salt, boron, and selenium loading to the lower San Joaquin River caused by the project. Additionally, the fact that groundwater degradation is an ongoing trend in the area does not eliminate the need to disclose groundwater degradation as a potentially significant impact of the proposed alternative.

If you have any questions regarding these comments, please contact me (gcismowski@waterboards.ca.gov, 916-464-4608).

GAIL CISMOWSKI, Environmental Scientist
Agricultural Unit

cc: Lonnie Wass, CVRWQCB Fresno

RESPONSE

**Gail Cismowski:
August 6, 2007**

Comment CVRWQCB

1

HydroFocus (Table 2, 2003)² reported on the chemical quality of water from drainage sumps in the area (see Attachment 2). The sumps collect shallow groundwater beneath irrigated lands and samples from them are representative of the shallow groundwater. Average electrical conductivities ranged from about 2,200 to 10,700 micromhos per centimeter at 25°C. Average selenium concentrations in water from these sumps ranged from 0.014 to 0.233 mg/l. Shallow groundwater in the study area is indicated to be present under oxidized or aerobic conditions, and is largely in brown or tan colored Coast Range alluvium. High nitrate and selenium concentrations and no hydrogen sulfide odor in the shallow groundwater are indicative of oxidizing conditions.

Groundwater in the underlying Sierran sands had electrical conductivities ranging from about 3,750 to 7,100 micromhos (Table 3 of KDSA, 2006), or within the range of values for water from the drainage sumps. Nitrate and selenium concentrations in this deeper groundwater are normally not detectable, and this water usually has a noticeable hydrogen sulfide odor. The presence of hydrogen sulfide and the absence of detectable selenium concentrations are expected under reduced or anaerobic conditions in the groundwater.

Subsurface geologic conditions are important in evaluating the potential for downward flow of shallow groundwater. KDSA (Figure 2, 2006) indicated that predominantly fine-grained Coast Range alluvium in the study area was about 25 feet thick near the east edge of Subsurface Geologic Cross Section A-A' and about 140 feet thick near the west edge of this section. A number of test holes have been drilled into these shallow Coast Range deposits, primarily for monitoring purposes. Normally these deposits are predominantly clay to the total depth, with several interbedded relatively thin sand layers. While the sand layers have high hydraulic conductivities and readily convey groundwater laterally to downgradient areas, the low vertical hydraulic conductivities of the thicker interbedded clay layers greatly retard the downward flow of ground-water.

Besides the fine-grained Coast Range deposits, another confining bed is present in the east part of the study area (KDSA, 2006). This is a clay layer normally about 70 feet deep that is termed the A-clay. This clay also retards the downward flow of shallow groundwater into the underlying Sierran sands. The A-clay has been studied in detail in the vicinity of the Mendota Pool (KDSA and Luhdorff & Scalmanini annual monitoring reports on the Mendota Pool Pumpers project).

Downward head gradients are generally predominant in the study area, except in some locations near the San Joaquin River. The proposed project will increase these downward head gradients above the Corcoran Clay. Drawdowns were projected to be about 65 to 90 feet

² References cited herein are listed in Appendix A of the Final EA/IS except for the HydroFocus pumping test results report which is incorporated as Attachment 2 to this Comments and Responses Appendix F.

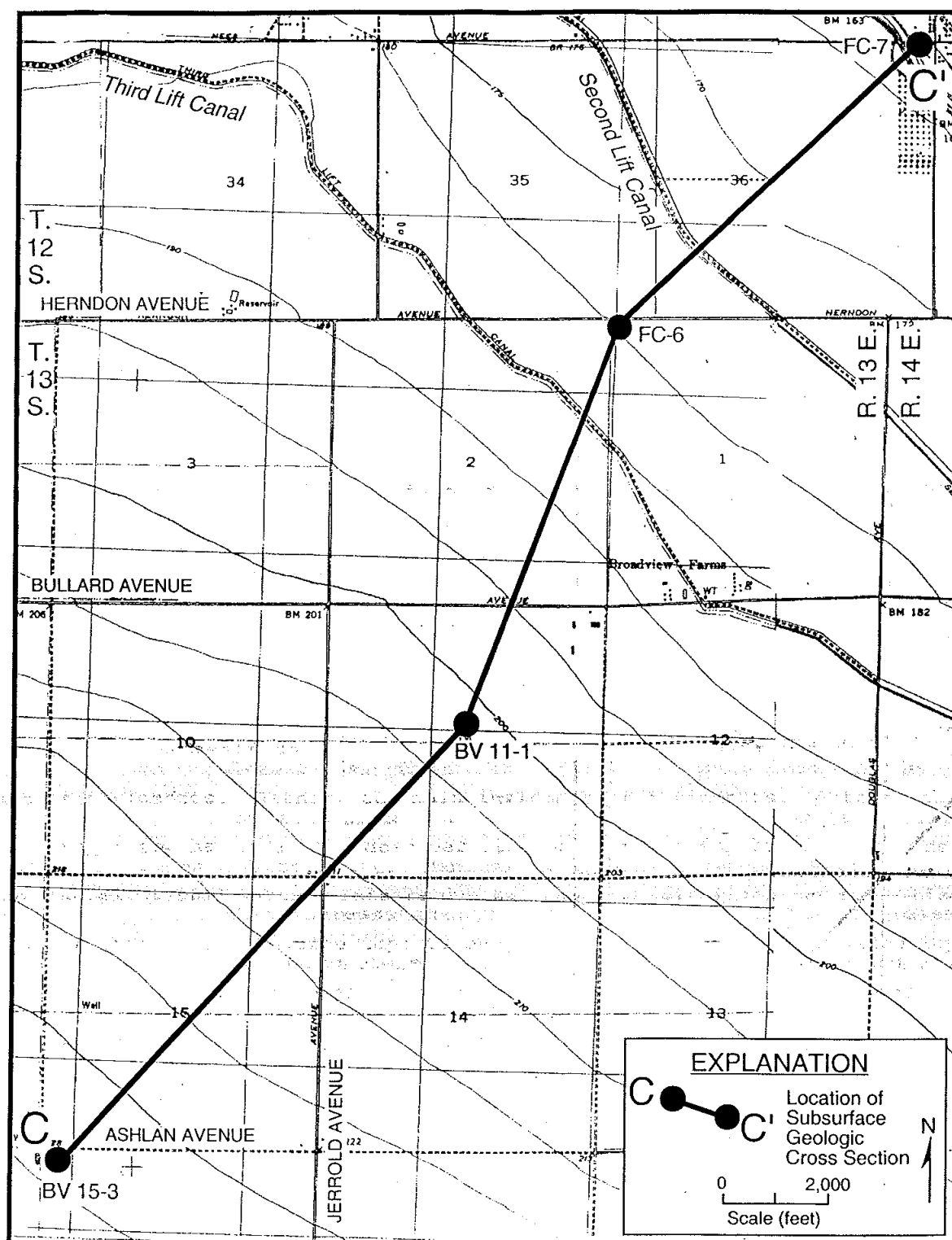
in the strata below a depth of about 150 feet (the approximate top of the perforations in the proposed recovery wells).

Some evidence on the influence of pumping the deeper wells on the possible downward flow of poor quality shallow groundwater was provided by HydroFocus (2003). First, water levels in shallow wells were measured during the long-term pump tests on the Snyder and Del Rey wells (considered pilot wells). These measurements indicated that the drawdowns in shallow wells were small (from about 0.05 to 0.58 foot after 50 to 60 days of pumping the deeper wells). Also, water samples were collected from each of the two wells near the beginning and ending of the pumping periods. Electrical conductivities slightly decreased and selenium concentrations remained non-detectable in both wells during pumping, and this did not indicate increased downward flow.

There are a number of CCID and FCWD wells and other private wells in the area northwest of Mendota, that tap the Sierran sands. Most of these wells are located where the A-clay overlies the Sierran sands. Even though many of these wells were pumped over many years, the pumped groundwater continued to have no detectable selenium concentrations and to contain hydrogen sulfide. The same situation has been observed for City of Firebaugh wells that are in a similar hydrogeologic setting. The downward flow of the aerobic, higher selenium shallow groundwater is indicated to be so slow, that the selenium would be reduced (and thus non-detectable), once this groundwater was in the Sierran sands.

Additional mitigation measures would be incorporated into the project to minimize the downward flow of shallow groundwater. First, the tops of the recovery well perforations would be placed below a depth of 150 feet (i.e., far below the base of the confining beds). The exact well design will be based on the results of electric logging either a test hole or pilot hole prior to construction of each well. The wells are to be designed to tap lower salinity water in the profile below a depth of about 150 feet and above the Corcoran Clay, as opposed to shallower poor quality groundwater. Second, the proposed pumping rate is close to that of the projected lateral groundwater flow in these strata. This in itself would minimize the downward flow of shallow groundwater. Third, groundwater monitoring using existing monitor wells can be used to evaluate changes in downward flow. In the 1980s and the late 1990s, a number of shallow monitor wells were installed by the Four Entities (predecessors of the Exchange Contractors) at three sites in the area upslope of the project. These wells tap permeable sand layers in the Coast Range deposits above a depth of about 50 feet. More recently, the Exchange Contractors installed another series of monitor wells, which extend deeper. The attached Figure 1, shows the locations of these monitor wells. Monitoring of the following wells would be incorporated into the project:

Monitoring of the monitor wells would be on a semi-annual basis, with one round about one week after pumping begins, and the other during the last week of the pumping period. Both water levels and groundwater quality would be monitored. The samples would be analyzed for the same constituents as proposed for the recovered water.



**FIGURE 1-LOCATION OF SUBSURFACE
GEOLOGIC CROSS SECTION C-C'**

2

The RWQCB correctly states that the CVP imports salts into the central San Joaquin Valley through surface deliveries, and there is an increase in salt loading due to the CVP. The proposed project would pump groundwater and use it on adjacent lands as most irrigation agencies do. This region currently discharges saline subsurface water into the San Joaquin River specifically through Mud Slough. When this project is looked as a companion to the Westside Regional Drainage Plan, the subsurface discharges would be significantly reduced to Mud Slough and the San Joaquin River. The Exchange Contractors are actively pursuing a local solution (WRDP) and we have been an active participant in the implementation of the Central Valley salinity management plan since its inception.

Irrigation in itself doesn't increase the salt load as suggested by the comments. Rather, the main influence of irrigation is an increase in salinity in the deep percolation compared to the salinity of the applied water. This is due to evapotranspiration, and is not a salt load. Adverse impacts on groundwater are minimized in areas where low TDS surface water is used for irrigation, as opposed to groundwater. The comment that "the proposed alternative will increase salinity in the aquifer" is not true for the aquifer in the FCWD and Camp 13 Drainage Area, in the laterally downgradient area, nor in the lower aquifer beneath the Corcoran Clay. **Rather, control of the lateral migration of high salinity groundwater will result in improvements in groundwater salinity in downgradient areas.** As for the larger (regional) area, the salt in the recovered groundwater was already in the groundwater, and would not be an addition to the groundwater. Thus salt loading in the valley would not be increased as suggested by the comment. The proposed alternative doesn't compound the problem, but instead directly addresses a critical local groundwater degradation process due to downgradient flow of poor quality groundwater. This lateral flow was determined by Todd Engineers (2003) to be a major problem in Madera County that needed to be addressed by future groundwater management activities.

The Exchange Contractors believe in management of groundwater salinity. They and their predecessors, the Four Entities, have been concerned for many decades about salt in imported water brought into the area to irrigate upslope lands. The Exchange Contractors have funded considerable hydrogeologic investigations and groundwater monitoring to provide a better understanding of the groundwater system and activities that increase the groundwater salinity in their service area. The proposed groundwater pumping/water transfer project is an important component of a groundwater management plan that addresses severe groundwater quality degradation due to the downgradient lateral flow of poor quality groundwater.

3

There will be minor increases in salinity within the Outside Canal when compared to the variation in salinity currently experienced within the canal. The water quality in the canal is influenced by the tidal action within the Delta from where the Delta-Mendota Canal Water is pumped. At times the EC in the canal varies by over 1,000 EC in a 24 hour period. CCID is committed to managing the pumping program to maintain a downstream blended quality of less than 700 EC which is the standard that has been in place for many years for our farmers own pumping wells into the CCID system.

4

The comment seems misguided. Concerning groundwater accretion to the San Joaquin River and its tributaries, there is the potential that the project would provide a slight reduction to accretions in the downslope areas due to the lowering of groundwater. Therefore, the project would be a benefit to the load concerns for the river. Return flows from the Exchange Contractors are expected to be not affected by the project and therefore do not affect the current or future circumstance of the San Joaquin River. The countering potential increase in loading due to the refuges incidental receipt of water passing through the project area would be minor and need to be addressed in the broader subject of the refuges' operation and water supply conveyance. In addition, to the extent that funding from this proposed transfer is necessary to implement the WRDP, there would be the elimination of the remaining discharges to the San Joaquin River from the Grassland Drainage Area.

The EA/IS calls out monitoring. The monitoring program will evaluate the water quality in each of the wells, and minimization of the total salt load will be achieved. The mitigation may include managing the wells so that they are pumped at different time of at different rates, implementing additional conservation measures with in "saline sink" area of CCID/FCWD, and /or rotational fallowing of lands in the same area.

5

The incremental effect of the project is but one single component of the overall plan of the Exchange Contractors to address the long-term solution for water quality control in the area. This single component of action is at most a neutral to very minor increase to loading in the San Joaquin River, but is a component of the overall solution that significantly reduces loading to the river.

Section 1.3 of the Final EA/IS presents the related plans and projects. In short, the groundwater pumping/water transfer project of the Exchange Contractors is one component (groundwater management) of their overall drainage plan known as the Westside Regional Drainage Plan (WRDP). Groundwater management is one method of reducing shallow groundwater in the crop root zone and reduces drainage production and was recognized as one tool for source control available to the districts in the San Luis Drainage Feature Re-evaluation Plan Formulation Report and subsequent EIS/EIR. Funds generated from the water transfer would also assist in implementation of the other source control, re-use, and treatment components of the Plan.

The Westside Plan includes the Grassland Bypass Project which is proposed for extension past 2009 to allow for time to implement the final treatment phase of drainage remaining after collection and reuse. Major features of the Westside Plan were incorporated into Reclamation's San Luis Drainage Feature Re-evaluation (SLDFR) preferred alternative and Record of Decision. The districts in the drainage-impacted area, including FCWD and the Camp 13 area of CCID, are responsible for reducing their drainage volumes prior to collection for reuse and treatment at the Panoche Drainage District facility that is part of the Grassland Bypass Project. The Grassland Bypass Project was evaluated in an EIS/EIR completed in May 2001, and a new EIS/EIR will be prepared for the continuation of the

project past 2009. Expansion of the reuse facility was evaluated in an Initial Study with a Mitigated Negative Declaration approved by Panoche Drainage District on August 21, 2007.

Although Reclamation is in discussions with drainage-impacted districts valleywide on alternatives to Reclamation providing drainage service (i.e., the concepts for collaboration), the need for local management of shallow groundwater (source control) and financial support for regional reuse and treatment in the SLDFR “Northerly Area” (i.e., Grassland Drainage Area) continues. The groundwater pumping/water transfer project is one piece of the regional drainage solution. Other components of the solution have been or will be evaluated in the SLDFR and Grassland Bypass Project NEPA/CEQA documents. At issue is what will come out of the collaborative discussions, and additional NEPA/CEQA analyses may be required for the resulting project.



NATURAL RESOURCES DEFENSE COUNCIL

MEMORANDUM

To: Bob Eckart, US Bureau of Reclamation
Steve Chedester, Joann Toscano, SJ River Exchange Contractors
Chris White, CCID

From: Hal Candee, NRDC
Gary Bobker, The Bay Institute

Date: August 20, 2007

Re: Initial Comments on Draft EA/IS on 25 Year Water Transfer Project

Thank you for inviting our comments on the referenced document and for providing an extension of the comment deadline under both CEQA and NEPA. We intend to provide additional comments on this document before the new deadline of August 22nd provided today by Jeff McCracken of the Bureau of Reclamation and the new deadline of August 27th provided today by Chris White of CCID. In the interim, however, we are submitting these initial comments on behalf of our two organizations.

At the outset, we wish to incorporate by reference as if fully set out herein the August 6, 2007 comments filed by the Central Valley Regional Board (see letter from Gail Cismowski to Bob Eckart, copy attached to this transmittal) and the August 6, 2007 comments filed by the Department of Fish and Game (see letter from William Loudermilk to Steve Chedester, copy attached to this transmittal).

In addition, since this proposed action is also included within the broader set of drainage solution proposals recently put forward by the Westlands Water District, the San Luis Contractors and/or the Regional Office of the Bureau of Reclamation, we incorporate by reference as if fully set out herein our previous joint comments on previous versions of these drainage proposals (see our letters of June 5, 2007, June 27, 2007 and July 17, 2007, copies attached to this transmittal). All of the issues raised in those comment letters remain of concern, not least because of the linkages being proposed by Reclamation and others between the proposed project described in the subject Draft EA/IS and these larger drainage proposals.

Thank you for considering our comments. Please contact us if there is any question about these comments or the attachments or further information is requested.

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RESPONSE

**Hal Candee and Gary Bobker:
August 20, 2007**

Comment NROC/TBI1

1

The linkages between the proposed groundwater pumping/water transfer and the Grassland Bypass Project and SLDFR are summarized in Response CVRWQCB-5 above. We acknowledge that discussions on a valleywide drainage solution are still in progress.



NATURAL RESOURCES DEFENSE COUNCIL

August 27, 2007

Mr. Bob Eckart
U.S. Bureau of Reclamation
2800 Cottage Way, MP-150
Sacramento, CA 95825

Mr. Steve Chedester
San Joaquin River Exchange Contractors
P. O. Box 2115
Los Banos, CA 93635

Re: NRDC-TBI Comments on 25 Year Groundwater Pumping/Water Transfer Project
Draft EA/IS, Draft FONSI, and Draft Mitigated Declaration

Dear Mr. Eckart and Mr. Chedester:

Pursuant to the San Joaquin River Exchange Contractors Water Authority (SJREC) notice of intent dated July 2, 2007, and the Bureau of Reclamation's Press Notice dated July 6, 2007, and the subsequent extensions of the original comment deadline provided by Bureau staff, SJREC staff, and staff to Central California Irrigation District (the leading proponent within SJREC for this project), we thank you for seeking our input on the proposed project and the above referenced draft environmental documents and submit the following comments on behalf of the Natural Resources Defense Council (NRDC) and The Bay Institute to supplement the comments we previously provided to each of you on August 20, 2007.

As we indicated in our earlier comments, concerns about this project and these draft environmental documents have already been identified by other agencies, including the Central Valley Regional Board and the Department of Fish and Game. We have already incorporated those comments into our previous letter and will not reiterate those points here. Below we wish to specifically highlight some of our additional specific concerns and outstanding questions:

1. The draft NEPA/CEQA documents should be withdrawn, revised as a full EIR/EIS, and re-released for public comment after the completion of two closely interrelated and interconnected actions, i.e. development of a comprehensive solution to the west side drainage problem in lieu of the Bureau's recent Record of Decision (ROD) and the negotiation of any possible modifications in the use agreement and discharge deadlines involving the San Luis Drain. While certain elements of the proposed project have obvious value regardless of the outcome of these two other efforts, given the proposed scope of this groundwater pumping and water transfer project, and water quality and water supply issues involved, and the numerous linkages between the project and the unresolved fate of the newly proposed Westlands alternative concept proposal, it is difficult for the public to fully understand the full environmental impacts and the interconnected and cumulative effects of this project while the other two efforts remain unresolved. (We are attaching NRDC's August 24, 2007 memorandum to various

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NRDC-TBI Comments on 25 Year GW Pumping/Transfer Project DEA/IS
August 27, 2007
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Y Members of Congress identifying some initial concerns with the most recent iteration of the Westlands alternative concept proposal, and incorporate its contents in this letter as if fully set out herein.)

For example, the Bureau recently distributed a revised Draft of its Implementation of Drainage Services document (dated July 30, 2007), which states:

"In the Northerly Area...drain water is currently being discharged to the San Joaquin River through the Grassland Bypass Project.... [which] includes an agreement... to use a portion of the San Luis Drain (Use Agreement).... The Use Agreement will expire in 2009.

"However...the dischargers anticipate a need to continue to discharge for an additional term....[and] they have initiated a stakeholder process to negotiate with Reclamation a new Use Agreement and to complete appropriate environmental review and regulatory compliance requirements, including obtaining a new discharge permit from the Regional Board." Drainage Services 7/30/07 at p. 3.

None of these processes has been completed yet and important environmental issues remain unresolved because of the anticipated delays in meeting existing water quality objectives as part of the Bypass Project. Similarly, the same 7/30/07 Bureau document discusses a proposed Financial Plan by which, in exchange for 10,000 AF of water from the Exchange Contractors (CCID and Firebaugh), Westlands "will pay for Firebaugh's and Camp 13's drainage water treatment and disposal O&M expenses and one half of all other O&M costs of the WRDP." Id. at pp. 4-5. Yet there are inconsistencies between the present draft EA/IS and the ever-changing Bureau documents on the "Draft Collaborative Drainage Resolution" effort as to whether the transfer/exchange with Westlands is contingent on future approval of numerous other parts of the Westlands "package" that has been discussed in that larger effort, and the extent to which the overall 20,000 acre foot transfer program, including the 10,000 AF exchange with Westlands, will ultimately involve actual transfer of groundwater or a transfer of CVP surface supplies in exchange for increased groundwater pumping within the Exchange Contractor service area.

2 Finally, while groundwater pumping in this area has previously been studied by other Interior Department programs and studies, including the Rainbow Report, there is insufficient analysis of the potential effects of the currently proposed scale of the pumping project, especially the interconnected water quality impacts, and the implications of the more recent data from monitoring in and adjacent to the DMC. See USBR Delta Mendota Water Quality Monitoring Program, April 2007 (copy attached to these comments and incorporated herein by this reference).

NRDC-TBI Comments on 25 Year GW Pumping/Transfer Project DEA/IS
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2. The EA/IS is inadequate because it does not analyze the potential for degradation of the aquifer as pumped groundwater is potentially replaced by contaminated groundwater from above

3

As noted in the EA/IS, one of the potential impacts associated with the Project is drawdown in the upper aquifer, as well as similar effects in shallow wells. The EA/IS fails to analyze the potential for degradation of the region's wells by downward migration of the contaminated shallow groundwater, yet this has been identified by other planning efforts as an anticipated effect of groundwater programs in the drainage impacted areas. In the Central Valley Regional Water Quality Control Board's August 6, 2007 letter, they stated: "Pumping from this aquifer (above the Corcoran clay) will likely result in drawdown of the water currently near the surface, causing selenium, additional salts and other materials currently present at shallower depths to migrate deeper. If this is the case, mitigation measures should be evaluated and implemented where feasible." In light of the significant potential for water quality degradation, we believe it would be preferable if the EA/IS were replaced with an EIR/EIS and revised to identify mitigation measures or other contingencies in the event that the quantity of water available from groundwater pumping proposed in this project is reduced due to degradation of wells or other related impacts.

For all of the above reasons and the reasons set out in the attached materials and our earlier comments, we urge the Bureau to withdraw the proposed draft documents and revise and reissue more complete and appropriate NEPA and CEQA reviews after completing the processes discussed above. Thank you for considering these comments and the attachments included with this letter and with our previous comments.

Sincerely,



Hamilton Candee
Senior Attorney

Cc: Chris White, CCID
Gary Bobker, The Bay Institute

RESPONSE**Hamilton Candee:
August 27, 2007****Comment NROC/TBI2****1**

We disagree that the Exchange Contractors' 20,000 AFY groundwater pumping/water transfer project should wait until all issues associated with the extension of the Grassland Bypass Project past 2009 and whether to proceed with the SLDFR ROD or not are resolved. We fully recognize the linkages among the projects listed in Section 1.3 and in your attachments (provided in Attachment 1 of this report); however, the current project has independent utility for drainage management locally and provides transfer water at a time when south of Delta water users are facing severe shortages in supply. Efficient use of all CVP water supplies is a practical purpose in the immediate future, and not making 20,000 AFY available now does not benefit the public. Project benefits of drainage reductions and funds for capital improvements for regional drainage management would be delayed if the project were delayed. Sufficient information is available and provided in the Final EA/IS to assess the impacts of the proposed project as not being significant with mitigation incorporated and to place those impacts into a regional context. The cumulative impacts discussion of past, present, and reasonably foreseeable projects acknowledges uncertainty, but that uncertainty is not sufficient justification to delay the project. Meanwhile, the Grassland Drainage Area farmers seek practical solutions to their area problems and have made substantial progress both in drainage control and reductions in discharge of selenium and salts. An EIR/EIS on the 20,000 AFY project would not reveal further significant impacts. The impacts identified are not significant for the reasons stated in the EA/IS and in the responses to the DFG and CVRWQCB comments.

For a discussion of the need for additional cumulative impacts analysis, see also Response USFWS-17. Regional drainage problems and solutions will continue to be studied, but substantial information and facilities have been constructed and are planned based on current environmental analyses. At issue is funding drainage management facilities.

The project covered in the EA/IS is for a substitute groundwater supply for transfer. The pumped groundwater would be blended in CCID's Outside Canal and used directly within CCID, while CVP water from the DMC would be transferred to other users.

This project subject to this EA/IS is a stand alone. The ROD that was signed by Reclamation in July of 2007 is also a stand alone document. The ROD states that the northern subarea, which includes land with CCID/FCWD, may need to move forward before the rest of the SLU due to impending regulatory permits expiring and the fact they have jointly produced, and for the most part implemented the Westside Regional Plan. It should be noted that the commenters have been very supportive of the implementation of the WRDP. The outcome of the negotiations that are occurring with the San Luis Unit is unknown, and the direct linkage with this project is irrelevant. The project that is subject to this EA/IS can proceed with "independent utility" irrespective of the outcome of the larger San Luis Unit drainage settlement.

2

In addition to the data cited, see Attachment 2 for additional data, analysis and conclusions of the 2005 pilot study that are relative to the potential effects of the pumping project.

3

The potential for degradation of the aquifer has been addressed in Responses CVRWQCB-1 and CVRWQCB-2.

The EA/IS and this Responses to Comments document support a determination of no significant impacts that cannot be mitigated. Although the potential for groundwater impact is not significant, the Exchange Contractors will conduct monitoring over time as explained in Section 4.4.6 and in Response CVRWQCB-1.

Attachment 1

NRDC/TBI Comments of August 20, and 27, 2007

Attachment 1

Attachments to NRDC/TBI Comments of August 20, 2007 and August 27, 2007.

- 1-A 6-5-97
- 1-B PCFFA 6/27
- 1-C PCFFA 7/24
- 1-D WWD
- 1-E Water Quality

Attachment 1-A

**The Bay Institute
Natural Resources Defense Council
Environmental Defense**

June 5, 2007

Mr. Kirk Rodgers, Regional Director
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

RE: CONCEPTS FOR DRAINAGE RESOLUTION -Initial Reactions

Dear Director Rodgers,

Thank you for your recent briefings of our coalition of environmental groups and local governments regarding the ongoing discussions between the U.S. Bureau of Reclamation (Reclamation), Westlands Water District, and other San Luis Unit (SLU) contractors to develop and refine the ideas contained in the February 15, 2007 "Concepts for Collaborative Drainage Resolution" briefing paper (Drainage Concepts Proposal). Those briefings and the Drainage Concepts Proposal itself have raised a number of questions and concerns regarding both the proposal and the implementation of the Record of Decision for the Final San Luis Drainage Feature Reevaluation Environmental Impact Statement (San Luis ROD). Those concerns have increased with the Bureau's effort to develop an MOU incorporating the drainage concepts, and Westlands' announced intention to ask Congress to ratify the concepts this summer.

Our three primary concerns are:

1. We are highly skeptical that the Drainage Concepts Proposal will meet the needs of the affected parties and especially California's environment;

2. The idea of reducing the applicability of the Endangered Species Act and the CVPIA to a major Delta exporter at this particular moment in CVP history is remarkably inappropriate;
3. This new and very complex proposal may delay much-needed implementation of certain initial elements of the San Luis ROD, including parts of the Westside Regional Drainage Plan, which are generally supported by the environmental community as well as the SLU contractors - and are prerequisite for removing drainage from the San Joaquin River.

However, we also have numerous other concerns regarding the Drainage Concepts proposal, as outlined below. We further note that many of the water allocation issues in the Drainage Concepts Proposal are already being negotiated in other arenas in which the SLU contractors have a seat at the table. Also, the relationship between the Drainage Concepts Proposal and the San Luis ROD, which were issued at about the same time, is unclear.

The San Luis ROD, while flawed in a number of areas - particularly its failure to select the most environmentally and economically superior alternative and its reliance on the use of evaporation basins - represents the first clear step by Reclamation toward implementing an in-valley drainage solution in a timely manner. Whatever the merits of the Drainage Concepts Proposal, it is an extremely complex package with linkages to a number of equally complicated issues beyond the scope of drainage management on the Westside San Joaquin Valley. We are concerned that intensive efforts to negotiate an agreement based on the Drainage Concepts Proposal, which would involve Delta endangered species, coordinated operation of the state and federal water projects, and transfer of federal property to the SLU contractors, among many other issues, will detract from Reclamation's commitment to move forward expeditiously to implement certain necessary elements

of the ROD including portions of the Westside Drainage Plan and extensive land retirement.

- What steps is Reclamation taking to implement the initial components of the ROD?
- What effect will the Drainage Concepts Proposal discussions have on Reclamation's schedule and budget for implementing any parts of the ROD?

The issue of the relationship to the ROD aside, the Drainage Concepts Proposal itself raises numerous questions and concerns. What follows is only an initial list of issues.

Concept 1: Assumption of drainage obligation

The idea that the SLU contractors themselves should be liable for managing the drainage created within their districts is logical and appealing. Indeed, like any business that creates a toxic byproduct, it is ultimately the job of the SLU contractors to eliminate the negative effects of their business. In our view, the United States should have been relieved of the obligation to provide or support drainage services - and of delivering federal water to the drainage problem lands -- once the impacts of drainage became known. Given the obligations of both federal and state law only to allow water deliveries that are reasonable and beneficial, Reclamation's continued delivery of water to drainage impaired lands remains a fundamental problem that the proposal completely sidesteps. The fact that Reclamation is now proposing to negotiate a new legislative package - including a proposed far-reaching transfer of water rights - in order to implement rather than simply repeal now-obsolete sections of a 1960 law is ironic at best.

We do not doubt that the drainage districts could implement an in-valley drainage solution. It also seems likely that the drainage program outlined in the ROD could be implemented more cost-effectively than the

ROD assumes, either by assigning the task to the districts or via the addition of incentives for drainage reduction as we have long proposed. On the other hand, we all know from experience that the planned drainage management systems can be extremely hazardous if improperly managed. It is important that the engineering and oversight of these systems guarantee their safety.

The nature of the transfer of the drainage obligation is therefore crucial. How would this obligation be enforced? Would this new SLU obligation apply fully to past and ongoing impacts that exist at the time of the transfer? In what venues would the public have the ability to review, comment on and/or challenge how the SLU contractors meet their drainage obligation? Will the State and Regional Water Boards, the EPA, and the federal and state fish and wildlife agencies have as much authority to monitor and correct for adverse impacts after the transfer as before? Would the SLU contractors be required to post performance bonds or provide other assurances of their ability to adequately assume the drainage obligation?

It is important to note that historic and ongoing drainage impacts on wildlife and water quality were detected and over time reduced or eliminated because of an aggressive program of monitoring and oversight by regulatory agencies, particularly the Fish and Wildlife Service. What role would federal agencies with responsibilities to enforce the Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act, and other statutes have in the oversight and enforcement of the SLU drainage obligation? How would the SLU contractor's assumption of the drainage obligation affect the monitoring, research and oversight regimes currently implemented by these agencies?

During your briefings you made it clear that a primary motivation for the Drainage Concepts Proposal is to avoid the high cost of providing drainage,

notwithstanding the fact that such drainage expenditures would be reimbursable under federal law. This raises the obvious question: how can Westlands and certain other SLU contractors afford it if Reclamation cannot? Also, your staff suggested that Reclamation would have difficulty obtaining reimbursement of its drainage investments from the SLU Contractors due to a lack of "ability to pay" yet your proposal implies that those exact same contractors are fully capable of covering all those same investments on their own without Reclamation's interest-free federal financing. Does this cause Reclamation to support the repeal of such outmoded "ability to pay" concepts from Reclamation law? If not, why not?

A final concern is the relationship of the Drainage Concepts Proposal to the elimination of drainage discharges to the San Joaquin River. As you know, phased elimination of river discharge is currently required in the Central Valley Regional Water Quality Control Board permit and the Grasslands Bypass Agreement for Use of the San Luis Drain. This drainage obligation is independent of both the San Luis ROD and the Drainage Concept Proposal and has been pursued by the Grassland area districts for many years. What effect would the Drainage Concept Proposal have on the timing of that obligation being carried out? Is Reclamation proceeding with the steps that will facilitate elimination of river discharge other than linking it to the elaborate transfer proposals involved in the Drainage Concepts Proposal?

Concept 2: Means of providing drainage

One appealing element of the Drainage Concepts Proposal is that, at least as outlined so far, it would implement an in-valley drainage solution primarily without relying on the construction and use of new evaporation ponds. This raises at least two questions.

First, the SLU contractors appear to believe that an approach that relies on source control, land retirement, reuse, and new treatment technologies is sufficient to implement an in-valley drainage solution, without recourse to evaporation ponds. We agree. Given the consensus that exists on this issue, why is Reclamation unwilling itself to commit to an in-valley approach that does not include the use of evaporation basins, with their potential for major adverse environmental impacts? Why is Reclamation willing to urge Congress to approve a plan by which SLU Contractors pursue such an alternative approach but not willing to adopt such an approach itself?

Second, according to our calculations known management approaches can today effectively reduce over 90% of the current drainage volume generated on the west side. Addressing the remnant - about 8% of the total volume - will require the application of new treatment and disposal technologies now under development. Although we are confident that some combination of these technologies will be successful at eliminating the residual drainage volume, no particular treatment and disposal option is guaranteed to succeed, or to be implementable without causing adverse impacts. What is Reclamation's plan for holding the SLU contractors accountable for meeting the drainage obligation even if a particular treatment and disposal option is unsuccessful? For example, once Reclamation's water right is transferred an implied or actual threat of Reclamation cutting off water supplies to SLU contractors or not making carryover storage available in San Luis Reservoir would no longer be effective. What will be the instrument for ensuring retirement of lands from irrigation in the event such options are not successful?

Concept 3: Relief of capital obligations

The Drainage Concepts Proposal identifies certain amounts of money that Reclamation maintains are the

remaining capital obligations of the SLU Contractors, on the one hand, and the likely costs of implementing the ROD, on the other. But it appears that these numbers make all assumptions for the benefit of the contractors. For example, Reclamation's estimates of the drainage costs have gone up substantially in just a few years based on alleged increases in the value of certain lands, yet the capital costs have been frozen in time from decades ago, without interest, despite repeated evidence that interest charges should be applied. What effect will the expiration of the Westlands contract have on the anticipated collections of capital repayment and interest? What effect will current Delta problems have on the land values in Westlands when availability of water, rather than availability of drainage, is factored into the calculation? And what will be the effect on the Treasury if third parties are guaranteed no increased costs as a result of the proposal yet the SLU Contractors are forgiven all of their capital obligations?

Concept 4: United States relieved of liability

While it is obviously appealing that the proposal includes a full waiver of any claims of liability by the contractors against the United States, has Reclamation, Interior, OMB or Justice recently analyzed the potential risk and likely cost of such potential liability? Not only has the Sumner Peck payout been widely criticized both inside and outside the government, but since that time, the United States has won numerous important victories in other cases brought by disgruntled California water districts or landowners claiming a right to compensation against the United States due to its compliance with environmental laws. In light of the obligations of the United States under federal and state law not to export water in violation of endangered species protections, not to dispose of drainage in a manner that is harmful to wildlife or water quality, and not to deliver water in violation of

the reasonable and beneficial use requirements, has Reclamation asked other agencies of the federal government and Congress to assess its likely liability to the few hundred farms in Westlands Water District if the United States came into compliance with those federal and state laws rather than continuing to deliver water to all of the land in Westlands?

Concept 5: Transfer of San Luis facilities

Many other water districts and agencies are potentially affected by this particularly controversial element of the proposal, and we know many of them are asking questions of their own about the proposed transfer. We will just ask two questions that perhaps others have not raised: in light of the recent shutdown of state pumping facilities and some federal pumping facilities in the Delta and the reliance on San Luis Reservoir to meet priority water needs during the shutdown, has Reclamation analyzed whether there would be any difference in the implementation of this interim water supply approach if the SLU Contractors controlled San Luis Reservoir rather than the United States? Also, on the assumption that a large, off-stream South-of-Delta reservoir with connections to the California Aqueduct might conceivably have some market value, especially in a prolonged California drought, what steps has Reclamation taken to find out what the fair market value would be for this facility?

Concept 6: Transfer of water rights

The proposed transfer of water rights currently held by Reclamation to the SLU contractors raises at least three major issues. First, Reclamation is required by Congress under the Central Valley Project Improvement Act Section (CVPIA) 3406(b)(2) to provide 800,000 acre-feet of CVP yield annually for environmental purposes, and to meet a number of other environmental and water quality obligations pursuant to CVPIA and other statutes, including fish and wildlife refuge supplies,

Trinity River Restoration Program activities, and Endangered Species Act biological opinions. What would be the impact of transferring the water right on Reclamation's ability to provide (b)(2) water and fulfill other environmental obligations? What impact would the transfer have on CVP operational flexibility and its Operations Criteria and Plan? We understand some of the SLU contractors have acknowledged at recent Reclamation meetings that escaping their obligations under these environmental laws is a major motivation for pursuing these drainage proposals. How is Reclamation planning to address this shift in applicability of these laws and what effects will the proposal have on the species that are dependent on those laws and on other contractors who may have to make up the difference if SLU Contractors have reduced obligations?

Second, the Drainage Concept proposal would establish a new right for SLU contractors to 1 million acre-feet (af) of water from the Delta, as opposed to 1.4 million af of water that Reclamation is currently contracted to deliver to SLU contractors. However, Reclamation seldom delivers the full 1.4 million af, and in some years, especially critical years, delivers less than 1 million af. Would transferring the water right result in a net increase in Delta diversions and actual deliveries over baseline conditions? Will transferring the water change the timing of deliveries to Westlands? Has Reclamation considered the potential impacts of a proposed water rights transfer on conditions in the Delta, where native species are at high risk of extinction (in part as a result of shifts in the magnitude and timing of Delta exports)? What Section 7 activities is Reclamation planning to conduct to evaluate the endangered species impacts of the proposal before it is adopted in an MOU, contract renewal or a legislative proposal, and what analysis and determinations of endangered species impacts will be conducted by FWS, NOAA Fisheries, and California Department of Fish and Game on the proposal?

Third, the Drainage Concept proposal does not address potential competition between Reclamation's interests and the new water right holders. For instance, would the new water rights permit be senior, junior or equal in priority to Reclamation's water rights?

Concept 7: Use of Jones Pumping Plant

The use of the Jones and Banks pumping plants are of increasing interest to numerous agencies of the federal and state government. The Drainage Concepts Proposal makes a number of definitive statements about what the proposal's impacts would or would not be, and then in other cases defers any discussion until further details are negotiated. Have those further details been negotiated since the February 2007 concept paper was issued so that answers to those questions can now be provided? Do the State Water Board, EPA, FWS, DFG, and DWR agree with your assessments of the likely impacts of the proposal on the two pumping plants and their various use agreements and operations?

Concept 8: Restrictions on use of Permit No. 12860

The Drainage Concept proposal includes an agreement to indemnify the SLU contractors against any future "discretionary" actions by regulatory agencies to protect fish and wildlife, by using Environmental Water Account and/or CVPIA resources. This is not only extremely misguided public policy, but it appears to contradict the efforts of Reclamation and the SLU contractors, along with other federal, state and local entities, that are developing the Bay-Delta Conservation Plan. The intent of the Conservation Plan is to identify those conservation measures and user commitments necessary in the future to protect and recover endangered species in the Delta.

Furthermore, at the same time that it would increase the federal government's liability, the Drainage

Concept proposal would reduce Reclamation's ability to cover this liability, by reducing SLU contractor payments to the CVPIA Restoration Fund.

Finally, the proposal is extremely vague. What is the basis for Reclamation agreeing that the United States will make up water lost to the SLU contractors as a result of compliance with Endangered Species Act? What is the basis for assuming that the State of California, which funds the EWA, would agree to dedicate EWA assets to indemnifying the SLU contractors from the impacts of complying with federal obligations? What is a "discretionary" fish and wildlife action, according to the proposal? If an action is necessary to protect a species listed under the federal or state ESA, but Reclamation does not have enough financial or water assets to "make up the water lost to SLU contractors" what will Reclamation do?

Concept 9: Use of CVP power

What is Reclamation's rationale for allowing SLU Contractors to escape their previous duties under various federal regulatory laws as part of this proposal, yet continuing to offer them free or cut-rate benefits of CVP power as if they were still CVP contractors?

Concept 10: Restoration Fund payments

The Drainage Concept proposal includes a reduction in payments by the SLU contractors to the CVPIA Restoration Fund (RF). This raises at least three concerns. First, implementation of the proposal - or of any alternative approach to managing drainage and/or operating the federal project - should not relieve the SLU contractors of their obligation under the CVPIA to mitigate past and continuing impacts of the CVP.

Second, the proposal justifies the reduction on the basis of a change in allocation to SLU contractors from

1.4 million af under current Reclamation contracts to 1 million af under the proposed new water right. However, SLU contractors make payments into the RF per acre-foot delivered - in other words, any changes in actual deliveries are reflected in the actual RF payment.

Third, the proposal includes language suggesting that SLU contractors would have some measure of control over the selection of projects for implementation using the RF. Is this language consistent with Reclamation's obligations under the CVPIA to administer the RF and implement CVPIA projects? Is Reclamation proposing to grant SLU contractors greater say over RF allocations and project selection than other CVP contractors and the public?

Concept 11: Points of delivery

This section discusses the San Felipe Division, the Delta-Mendota Canal and the Mendota Pool. In your briefings, you indicated that they many other contractors who use these various facilities have not yet decided whether they endorse the Drainage Concepts Proposal. Have they done so now? If so, can you share their views with us? If not, at what point would Reclamation need to obtain their consent before proceeding with this proposal?

Concept 12: Effect on existing water service or repayment contracts

The discussion of how the M&I Shortage Policy and other relationships between SLU Contractors and other contractors would be affected under the new proposal is very brief and general and is therefore hard to evaluate. For example, the proposal acknowledges that Reclamation's need to do exchanges with the SLU Contractors to meet some of Reclamation's other South of Delta needs will likely lead to Reclamation allowing the SLU Contractors access to North of Delta storage, perhaps including carry-over storage, etc. Consistent

with the questions we raised above concerning the transfer of the water right, it will be helpful to receive further information from Reclamation about how the proposed transfer of this major water right to a non-federal entity will affect all of these priorities and relationships, including under such an exchange.

Concept 13: Benefits to the environment

The Drainage Concept proposal asserts that new environmental benefits will be created as a result of reducing the allocation to SLU contractors from 1.4 million to 1 million acre-feet when water rights are transferred. This element raises at least four major concerns.

First, the proposal states that up to 400,000 acre-feet would be available for environmental purposes, based on the 400,000 af reduction. In many years, however, Reclamation has delivered less than 1 million af to the SLU contractors. Furthermore, times when deliveries exceeded 1 million af include years prior to the imposition of new requirements under the CVPIA, Bay-Delta Accord and other measures. Yet Reclamation's most recent modeling runs show that most of the 400,000 af is paper water, rather than water actually provided to the environment. What assumptions did Reclamation use to estimate potential environmental benefits? In what percentage of years would no potential environmental benefits (i.e., water in excess of 1 million af) be created?

Second, the proposal would transfer water rights for 43,000 acre-feet from the SLU contractors to the U.S. Fish and Wildlife Service. What priority would this water have in relation to the new water right or existing CVP contract water? How reliable is this water right as a source of environmental water, i.e., what is the probability that the full amount will be available, especially in dry and critical years when it is needed most?

Third, the proposal refers to potential environmental benefits. There is no description of how new environmental water would be managed or allocated, let alone a commitment by Reclamation to dedicate water "saved" (as a result of transferring the water right, if any) to environmental purposes. Does Reclamation intend to formally dedicate any new water to environmental purposes, or would the environmental benefits be a discretionary action on the part of Reclamation?

Fourth, a portion of the environmental benefits promised as part of this package duplicate the environmental benefits that we have long been promised under the Bureau's drainage plans. In a series of meetings regarding the EIS, your staff informed us that the water that would otherwise have been delivered to the 200,000 or more retired acres would revert to the Central Valley Project, to be used for Project purposes (including the environment). Labeling this water now as a benefit accruing from the Drainage Concepts proposal is disappointing, at best. It also raises an accounting question: Did Reclamation assume in the ROD that the cost of retired land would reflect "with-water" as opposed to "dry-land" value, yet not assume that Reclamation would obtain the water that otherwise would be delivered to the retired lands? How is the "with-water" or "dry-land" value incorporated into the cost calculations of the Drainage Concepts proposal? How does the amount of water that would otherwise be used on these retired lands compare to the amount of water promised in item 12.a of the Drainage Concepts proposal? How has Reclamation evaluated its own land classification requirements and federal and state reasonable and beneficial use requirements in analyzing how water will be allocated from retired lands and how land will be valued for retirement purposes?

We also note the language in the draft Drainage Resolution MOU states that Westlands would not retire

194,000 acres from irrigated agricultural production, an element of the drainage program described in the San Luis Drainage Feature Re-evaluation ROD. Instead, Westlands only proposes to retire a total of approximately 100,000 acres. What effect will this reduction in land retirement have on the amount of water "saved" for the environment? What will be the environmental effects and increased cost of treatment of this increase in drainage volume relative to that assumed in the ROD?

Concept 14: Effect on Reclamation law obligations

When Congress was persuaded by West Side advocates to invest massive federal funds to build the San Luis Unit, one of the asserted benefits was to be the break-up of the large farm operations on the west side as a result of Reclamation law. For over 40 years, the San Luis Unit has been the most celebrated example of abuses of that law, with farms spanning thousands of acres and public subsidies worth millions being bestowed on wealthy farmers. Finally, in 2007, the outmoded original SLU water contracts are about to expire for the largest of these contractors and now Reclamation is proposing a complete exemption from all of those laws that originally justified the massive interest-free public investment. If the SLU Contractors are to receive the full benefits of the investment made by the Reclamation Program, without having to comply with the family farm and other purposes that justified the original interest-free investment, what is Reclamation's rationale for not going back and collecting the interest on the original investment as part of this proposal? And how will Reclamation account for the foregone interest on capital in its financial analysis of this proposal when submitted to Congress, including the Congressional Budget Office (CBO)?

Concept 15: Environmental compliance

The proposal discusses the cost allocations for environmental documents but not the timing. Is there an approximate schedule for such compliance documents that is available for review?

Concept 16: Contingent upon legislation

Has Reclamation analyzed how the new PAYGO concepts would be handled in any federal legislation approving the proposal? Since the "drainage obligation" is still a matter of unresolved, pending litigation and has never been determined to have a specific cost associated with it, whereas the foregone capital repayment and CVPIA payments are specific and identifiable by CBO, does Reclamation anticipate hundreds of millions of dollars in likely PAYGO cost obligations that will need to be offset by this proposal? If so, what offsets is Reclamation currently anticipating to include as part of its legislative proposal?

Concept 17: Third party impacts/beneficiaries

There have been numerous lawsuits by SLU Contractors against Reclamation over Reclamation's use of San Luis Reservoir to benefit the San Joaquin River Exchange Contractors, and related issues. How will this proposal affect those issues and the outcome of those cases? Have the Exchange Contractors approved the proposed transfer of San Luis Reservoir to SLU Contractors? What other Third Parties is Reclamation including in its definition? Does it include commercial and sport fishing interests affected by exports to SLU Contractors? Does it include in-Delta water users and their communities affected by exports to SLU Contractors? Does it include beneficiaries of the wetlands in the Grasslands Refuge complex?

In summary, the range of issues, concerns and questions raised by what is on the one hand an extraordinarily complex and on the other hand an extremely vague

Mr. Kirk Rodgers

June 5, 2007

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proposal regarding not only drainage management but water rights, project operations, endangered species regulations, facilities ownership, and other elements, is simply enormous. We are concerned about the practicability of addressing the scope of such a proposal as well as Reclamation's commitment to implement the needed drainage reduction and land retirement measures while an alternate proposal is being pursued.

We look forward to hearing Reclamation's positions on the above questions. Thank you for seeking our reactions to the Drainage Concepts Proposal and for your willingness to provide us with briefings and materials about it.

Sincerely,



Gary Bobker
The Bay Institute



Hamilton Candee
Natural Resources Defense
Council



Thomas J. Graff
Environmental Defense



Dr. Terry Young
Consultant to TBI and NRDC

cc: Senators Dianne Feinstein and Barbara Boxer
Representatives George Miller, Grace Napolitano,
Jim Costa, Dennis Cardoza and Ellen Tauscher
Assistant Secretary Mark Limbaugh
Dale Hall, Director, FWS
DWR Director Lester Snow

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Tom Birmingham, Westlands Water District
Steve Chedester, SJ River Exchange Contractors
Jeff Kightlinger, Metropolitan Water District
Greg Gartrell, Contra Costa Water District
Walt Wadlow, Santa Clara Valley Water District
John Kopchik, Contra Costa County
John Herrick, South Delta Water Agency
Dante Nomellini, Central Delta Water Agency
Karen Schwinn, US EPA
Russ Strach, NOAA Fisheries
Theresa Presser, USGS
Stephen Macfarlane, Department of Justice
Michael Lauffer, State Water Resources Control
Board
David Nesmith, Environmental Water Caucus

Attachment 1-B

**The Bay Institute
Natural Resources Defense Council
Environmental Defense
Pacific Coast Federation of Fishermen's Associations**

June 27, 2007

Mr. Kirk Rodgers, Regional Director
Mr. Federico Barajas, Assistant to Regional Director
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

RE: June 21st Draft Drainage Implementation Agreement - Initial Comments

Dear Kirk and Federico:

Thank you for circulating the June 21, 2007 revised document outlining initial "ideas" from the Bureau's Regional Office on the first group of issues your process is tackling, i.e. approaches to drainage management and drainage liability. (The document is entitled "Implementation of Drainage Services: Draft Collaborative Drainage Resolution." We will refer to it here as the June 21st "draft" or "proposal.") We agree it makes sense to analyze those two sets of issues at the outset, but do have a number of questions and comments about the draft. We are submitting this letter on behalf of NRDC, PCFFA, the Bay Institute and Environmental Defense; however, we first wish to provide our own disclaimer that paraphrases Interior's disclaimer in the document:

The following comments on the Bureau's June 21st draft represent some initial reactions to ideas by Reclamation's Regional staff for consideration as part of an ongoing deliberative process. These comments should not be construed as an endorsement of the underlying premises of the collaborative drainage resolution. Rather, as interested parties, we provide these comments to further dialogue and provide input. This document and the views it contains have not been reviewed or approved by any other conservation group, nor approved by attorneys or others representing any of the intervenor-defendants in Sumner Peck v. Department of the Interior, and they do not represent the final views of any party.

We have several concerns regarding the June 21st proposal, as outlined below. We further note that the relationship between this new proposal and the February 15th Drainage Concepts Proposal, the most recent May and June draft MOU's, and the final San Luis Record of Decision, which have all been issued by your office in recent months, is unclear.

Also, at the outset, there are two questions that some of us raised with you earlier this month, that have still not been fully answered which we believe are critical to understanding the context of this new June 21st proposal:

- A. What steps is Reclamation taking to implement the initial components of the ROD?
- B. What effect will the new drainage discussions have on Reclamation's schedule and budget for implementing any parts of the ROD?

The issue of the relationship to the ROD aside, the June 21st proposal itself raises numerous questions and concerns. What follows is only an initial list of issues.

1. Does this new document supersede all versions of the MOU, or do those earlier MOU drafts still have relevance to the present discussion?
2. Is this new proposal a briefing paper, an MOU, a draft agreement, or something else? If it is an agreement or MOU, which parties, including agencies and stakeholders, would Interior expect ultimately to sign this June 21st draft?
3. Given that Interior has not yet had any review or approval from its own agencies for the concepts included in the June 21st draft, is Interior willing to accept a similar approach by other stakeholders: i.e. concepts put forward that may later be changed, reconsidered or wholly rejected by the party offering them?

Comments on specific provisions of the June 21st Draft Agreement:

4. What's intended by the opening phrase (on page 1, section 1: "Upon enactment of Federal Legislation authorizing implementation of collaborate (sic) drainage solution...")? Is this a pre-condition? What if other parties disagree with that condition – is that the end of this exercise? Also, what exactly does that phrase refer to: is it legislation authorizing ANY collaborative drainage solution or the specific one Westlands proposed back in Feb or in its recent MOU or some other?
5. There are 3 different references in this short document to "relieving" the US of its "obligations" related to drainage or the 1960 Act. Yet each one is drafted very differently. Some refer to Sec 1(a) AND Sec 5 of that Act. Some only refer to Sec 1(a). And some don't refer to the Act at all but only to some

general obligation. What is the significance of these different references? What would be the effect of making them all uniform?

6. The last sentence of the opening paragraph says that only by Congress adopting new legislation will the SL Unit contractors undertake a drainage obligation. In fact, they could undertake the drainage obligation by various other means. Is the intent of this phrase to make the agreement therefore meaningless without federal legislation? Also, will the SL Unite contractors take on the entire "drainage obligation" that is currently being assigned to the US – or is it different?
7. This document envisions amending 1960 Act, repealing any government drainage obligation that could be read to exist in that Act, and imposing (via the same legislation) a new drainage obligation on others. Yet the document recognizes that only Congress can make the ultimate decision about the terms and conditions of new federal legislation. What is the Bureau's current expectation about when Congress (e.g. the House Natural Resources Committee, the Senate Energy and Environment Committees, etc) would start to participate in crafting those terms and conditions?

Section 1(a): means of providing drainage:

8. The statement that "Westlands will not retire 194,000 acres" appears preclusive about the future -- what if Westlands later decides it wants to do so? And why does the document use the future tense to refer to retirement of the 40,000 acres if those acres are already retired? What is Westlands' justification for retiring so much less acreage than the environmentally preferred alternative under the Final EIS, and what is the Bureau's justification for accepting such a dramatically different final amount of land retirement?
9. In line 32, what program is it that will be "duplicated" (as that term is used in the first sentence)?
10. The last sentence (line 37-39) of the first page refers to land retirement for source control purposes: is this additional land retirement or the same as described in the sentences above?
11. The reference to DWR quality assurance is helpful, but has DWR agreed to this role? And what role would Regional Board and US FWS play in such quality assurance, given their more extensive role in monitoring wildlife impacts and water quality impacts in the past? If no role is anticipated for these agencies, please explain why?

12. On p. 2, line 6: what does it mean that Westlands merely “anticipates” how it will accomplish evaporation? What if that doesn’t work? Are the SLU contractors fully responsible for meeting the drainage obligation even if anticipated approaches are not successful, e.g., even if the treatment technology that is proposed for implementation proves to be ineffective or harmful? And how will this obligation be enforced?
13. On line 15: once again there is a reference (although a different one) to “following congressional approval.” What exactly is intended here: a condition precedent? A simple description of time sequence?
14. The document states that the volume of drainage will increase, even though discharge to the River will decrease and source control measures and land retirement will increase. Why must Interior commit at this stage that there will automatically be more net drainage to manage? What is meant by the statement that this may only be “partially offset”? The timing of the facility construction phases is unspecified: how long a period of time will pass between when the drainage increases and when the construction of the treatment facilities catches up? What will be done in the interim?
15. What are the specifics of the GW transfer from CCID & Firebaugh to Westlands? Is that a CVPIA transfer, a direct transfer, an exchange?
16. The list of various funding sources is helpful but a bit hard to track: can this be compiled into a chart to show what those funds are currently covering, or will cover, what is left to cover, and when the funding will be needed?
17. Regarding the solar evaporation systems, have these previously been approved by the relevant state and federal regulatory agencies and the US FWS?

Section (b): engineering description:

18. The Chart on p. 4 includes high selenium concentration numbers in several places. Will those be discussed in this document (including management of that selenium per federal and state laws) or will that be handled by reference to other reports or future proceedings? Also, the diagram (figure 1) indicates that use of federal facilities will be necessary to implement the proposed drainage solution. Since the proposed solution would relieve the United States of its drainage obligation, would the SLU contractors reimburse the United States for all costs associated with use of these federal facilities?

19. Also, overall, how will this entire system function in time of extreme drought or periodic flood? Will it be designed to function at very low flow levels and very high flow levels?

Page 8, Solar Evaporation Units

20. How tested and how safe is this technology? What happens if there is still standing water anyway? What happens during periods of rain, when the uncovered evaporation units fill with water naturally? Can the interceptor tile located at the bottom of the unit keep up with this inflow? Or, might the units flood over? Is there a market for the sale of the salts? If not, where will the encapsulation areas be located and who will be in charge of their long term integrity?

21. On page 9 in the discussion of Implementation Schedule and Costs: can the Bureau give some examples of the types of adverse effects and environmentally damaging techniques that they expect to reduce via future technology? Is such technology currently being tested or designed?

22. What is the status of the Financial Plan referenced on p. 9? When will stakeholders who are attending these workshops be provided copies to review?

23. A major unanswered question inherent in this Draft Agreement is the relative feasibility of various techniques and processes, some of which were included in the Bureau's San Luis ROD. The Bureau has apparently been working on a Feasibility Report to accompany the ROD: what is the status of the Bureau's Feasibility Report and when will copies be made available for review?

Page 10, Section 3: Dismissal of Litigation, Waiver of Claims

24. Why is this written only in terms of "intent?" Will there be a written agreement to dismiss? Will it be required in this agreement? In the legislation? Will it happen before legislation is adopted and/or other actions are taken? What is meant by the phrase "it is expected that there will be indemnification agreements." Is that a promise to provide them? What if the expectation of indemnification agreements doesn't materialize?

We appreciate your providing this opportunity to review and comment on the June 21, 2007 draft. We look forward to hearing your responses to the above questions. Thank you, also, for seeking our reactions to the earlier Drainage Concepts Proposal and for your willingness to provide us with briefings and materials about it. Since some of those same Concepts are embedded in the

Mr. Kirk Rodgers
Mr. Federico Barajas
June 27, 2007
Page 6

new June 21st draft, we remain eager to hear your responses to the earlier comment letter from our groups about the Drainage Concepts Proposal.

Sincerely,



Gary Bobker
The Bay Institute



Hamilton Candee
Natural Resources Defense Council

cc: Barbara Geigle, Solicitor's Office, US Department of the Interior
Steve Thompson, Regional Director, USFWS
Karen Schwinn, US EPA
Russ Strach, NOAA Fisheries
Theresa Presser, USGS
Stephen Macfarlane, US Department of Justice
Lester Snow, Director, DWR
Tam Doduc, Chair, State Water Resources Control Board
Dan Nelson, San Luis Delta Mendota Water Authority
Tom Birmingham, Westlands Water District
Steve Chedester, SJ River Exchange Contractors
Jeff Kightlinger, Metropolitan Water District
Greg Gartrell, Contra Costa Water District
Joan Maher, Santa Clara Valley Water District
John Kopchik, Contra Costa County
John Herrick, South Delta Water Agency
Dante Nomellini, Central Delta Water Agency
Zeke Grader, PCFFA
Ann Hayden, Laura Harnish, Environmental Defense
Dorothy Green, Lisa Coffman, C-WIN
John Beuttler, California Sportfishing Protection Alliance
Jonas Minton, Charlotte Hodde, Planning and Conservation League
David Nesmith, Environmental Water Caucus

Attachment 1-C

**The Bay Institute
Natural Resources Defense Council
Environmental Defense
Pacific Coast Federation of Fishermen's Associations**

July 24, 2007

Mr. Kirk Rodgers, Regional Director
Mr. Federico Barajas, Assistant to Regional Director
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

RE: July 17th Draft Drainage Implementation Document - Further Comments

Dear Kirk and Federico:

Thank you for circulating the July 17th revisions to the June 21, 2007 document outlining initial proposals from the Bureau's Regional Office on the first group of issues your process is tackling, i.e. approaches to drainage management and drainage liability. (The document is entitled "Implementation of Drainage Services: Draft Collaborative Drainage Resolution." We will refer to it here as the July 17th "draft" or "proposal.") We are submitting this letter on behalf of NRDC, The Bay Institute, PCFFA and Environmental Defense, and because we have identified some of our initial concerns in our earlier comments, we incorporate by reference our earlier comment letter to you dated June 27th which addressed the June 21st Draft. Also, since your new draft continues to include an Interior Department disclaimer, we again provide our own disclaimer that paraphrases Interior's disclaimer:

The following comments on the Bureau's July 17th draft represent some initial reactions to ideas by Reclamation's Regional staff for consideration as part of an ongoing deliberative process. These comments should not be construed as an endorsement of the underlying premises of the collaborative drainage resolution. Rather, as interested parties, we provide these comments to further dialogue and provide input. This document and the views it contains have not been reviewed or approved by any other conservation group, nor approved by attorneys or others representing any of the intervenor-defendants in Sumner Peck v. Department of the Interior, and they do not represent the final views of any party.

We have several remaining concerns regarding the July 17th proposal, as outlined below. We further note that the parties who attended the Bureau's workshops last week (from which the current July 17th Draft emerged) were

provided some important new information about the context of this drainage proposal and its relationship to the most recent May and June draft MOU's, and the final San Luis Record of Decision, which have all been issued by your office in recent months:

- A. Both the Bureau and Westlands appear to admit that the "\$2.6 billion" price tag that has been used in reference to the ROD is significantly higher than what it would cost the Bureau simply to implement the same alternative technologies that the San Luis Contractors are now proposing. Indeed, the Bureau appears to acknowledge that if it had used more current data and analysis, and had been able to defer to the future the final resolution of some of the uncertainties (as the SLU Contractors are doing in this proposal), the total cost of implementing the ROD might be reduced by substantially more than \$1 billion.
- B. Similarly, the Bureau reported that its cost estimate for the Westside Regional Drainage Plan component of the ROD was around \$600 Million, yet the proponents of that same plan reported that the total cost is actually much less, i.e. about \$200 million, of which only \$60-80 million is still left to raise.
- C. Thus, it appears that the entire premise that launched these workshops and this alternative "collaborative" proposal was a set of federal cost estimates that now are acknowledged to have been wildly unrealistic.
- D. Similarly, Westlands has declared as if it were accepted fact that if the ROD is implemented, Westlands and other contractors will be given a 50 year interest-free period to repay the cost. Yet again, that appears to be a wildly unrealistic assumption and not a proper basis for making comparisons -- especially in light of the admitted need for a new Act of Congress amending the San Luis Act to implement the ROD at all. (For example, Congress could make future federal investments in the ROD and future CVP deliveries to drainage impaired lands conditioned on Westlands issuing the bonds it has now promised to issue, thus linking the waiver of future capital repayments, the future delivery of water, and the future implementation of the ROD to a "beneficiary pays" concept drawn from the CALFED principles.)
- E. Similarly, the Bureau announced in earlier briefings that Westlands could probably access additional federal subsidies under the outmoded "ability to pay" concept, yet Westlands itself has now boasted that it has so much ability to pay that it could assume the cost of a new Delta fix of up to \$1 billion for its few hundred farms and still add another substantial increase to its water rates to cover its own internal drainage costs - thus ridiculing any notion that the government could ever justify an "ability to pay" finding for Westlands.

- F. The net effect of all these admissions by Interior and the San Luis Contractors is to throw into serious question the entire basis for the "collaborative drainage dialogue" that Interior has invited the parties to undertake and, instead, to cause the public to ask the very obvious question as to why Interior is not re-calculating its own internal cost estimates and repayment assumptions for implementing the ROD before any of these discussions proceed further.

Putting the issue of the costs and other elements of the ROD aside, the July 17th Draft raises numerous other questions and concerns. What follows is only an initial list of issues.

1. This new document is supposed to be an attachment to a revised version of the June 8th draft MOU, yet for those parties who did not attend the final workshop last week (among the likely MOU signatories) there does not appear to be a current and updated version of the MOU to review. Will your office be circulating a new draft MOU before August 1st?
2. Since the July 17th document is only an attachment to the MOU, the question still remains what sort of document is it? If it is also an agreement or MOU, which parties, including agencies and stakeholders, would Interior expect ultimately to sign this July 17th draft?
3. Given that Interior was criticized in the Court proceedings many years ago for proposing a drainage plan that left open certain final choices on drainage treatments and technologies, yet this current Plan by Westlands does exactly the same thing, what guarantee is there in the July 17th Draft or the MOU to which it will ultimately be attached, that the correct choices will be made and an environmentally responsible drainage solution will be selected? What federal or state agency will be the backstop that ensures such an environmentally acceptable outcome?
4. Considerable time was devoted to discussing what's intended by the opening phrase (on page 1, section 1: "Upon enactment of Federal Legislation authorizing implementation of the collaborative drainage resolution..."), but unfortunately that discussion simply reinforced the earlier concerns expressed by numerous parties. Westlands has made clear its view that this phrase is intended to demonstrate explicit linkage between this July 17th Draft drainage document and the other parts of their overall "package" proposal. But as we previously asked what if other parties disagree with that condition – is that the end of this exercise? Also, given the changing nature of those other parts of the package, and the difficulty many parties have had attending any of these sessions given competing federal and state proceedings on the Delta, when

exactly does Interior expect the interested parties to be able to determine what the "package" contains so they can decide whether to participate and/or approve any part of it? As we indicated explicitly and repeatedly at the recent workshops and in conference calls with you and your Interior colleagues, at this point, the remaining elements of the package proposal, especially the water rights transfer idea and the facility transfer proposal, are extremely problematic and any package that includes them would have a very long way to go to obtain anything close to consensus support.

5. Another missing element in describing the package is a detailed account of what the remaining "\$83 million" is needed for to implement the Westside Regional Drainage Plan. The materials included in the July 17th Draft do not adequately answer that question nor explain when those costs would need to be incurred, nor what the effect would be if the State provided the \$40 million now envisioned but only \$25 or \$30 million of additional federal money was made available over the next 8 years.
6. Also, the Draft acknowledges that the use of solar evaporators is a major difference from the ROD, but few details are provided on the implications of going from a single small pilot use of such technology to the large regional projects envisioned in this proposal. For example, how would the requirements of the State's Toxic Pits Cleanup Act be met for the new regional projects as compared to DWR's pilot project?
7. This document envisions amending 1960 Act, repealing any government drainage obligation that could be read to exist in that Act, and imposing (via the same legislation) a new drainage obligation on others. Yet the document recognizes that only Congress can make the ultimate decision about the terms and conditions of new federal legislation. What is the Bureau's current expectation about when Congress (e.g. the House Natural Resources Committee, the Senate Energy and Environment Committees, etc) would start to participate in crafting those terms and conditions?
8. The discussion of land retirement has been considerably revised since the June draft, but it still fails to acknowledge the other numerous benefits to California of implementing a more extensive land retirement effort, including reducing Delta exports, reducing the amount of drainage to be managed, reducing associated environmental impacts from any drainage alternatives, etc. Given the findings in the Bureau's Final EIS on different levels of land retirement, what is Westlands' justification for retiring so much less acreage than the environmentally preferred alternative under the Final EIS, and what is the Bureau's justification for accepting such a dramatically different final amount of land retirement?

9. There are numerous references to what the Regional Board will do, DWR will do and the FWS will do. However, despite some limited participation by those three agencies in last week's workshops, none of these agencies consented to these tasks at the workshops. Has the Bureau now obtained a final sign-off from all 3 agencies on this document? Are they expected to sign or otherwise approve this document?
10. As we previously asked: what does it mean that Westlands merely "anticipates" how it will accomplish evaporation? What if that doesn't work? Are the SLU contractors fully responsible for meeting the drainage obligation even if anticipated approaches are not successful, e.g., even if the treatment technology that is proposed for implementation proves to be ineffective or harmful? And how will this obligation be enforced and how will the selection of an environmentally acceptable alternative be ensured?
11. The document states that the volume of drainage will increase, even though discharge to the River will decrease and source control measures and land retirement will increase. Why must Interior commit at this stage that there will automatically be more net drainage to manage? What is meant by the statement that this may only be "partially offset"? The timing of the facility construction phases is unspecified: how long a period of time will pass between when the drainage increases and when the construction of the treatment facilities catches up? What will be done in the interim?
12. What are the specifics of the GW transfer from CCID & Firebaugh to Westlands? Is that a CVPIA transfer, a direct transfer, an exchange?
13. The list of various funding sources is helpful but a bit hard to track: can this be compiled into a chart to show what those funds are currently covering, or will cover, what is left to cover, and when the funding will be needed?
14. A major unanswered question inherent in this Draft Agreement is the relative feasibility of various techniques and processes, some of which were included in the Bureau's San Luis ROD. The Bureau has been working on a Feasibility Report to accompany the ROD and reported at last week's workshops that it will be made available to the public this fall. This document is potentially a critical element for understanding this July 17th Draft and the entire drainage element of this package proposal. What is the Bureau's plan for providing an opportunity for review and comment on the Feasibility Report before finalizing this July 17th Draft? When will copies of the Report be made available for review as part of this workshop process?

Mr. Kirk Rodgers
Mr. Federico Barajas
July 24, 2007
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15. One of the assumptions made by proponents of this package proposal is that the San Luis Unit contractors are making a major donation to FWS and the public by allowing some of their water supplies to be reallocated to environmental purposes as part of this proposal. However, the requirements of CVPIA governing 3406 b(2) water, b(1) re-operation, b(1) un-contracted water, 3404(c)(2) administration of contracts, and 3406 compliance with ESA and SWRCB orders suggests that in fact the package may reduce rather than increase the amount of water going to the environment vs. going to Westlands. At what point will Interior staff do a comparison of the pluses and minuses of this proposal (in terms of water for the environment) vs. a likely scenario without this proposal so that the public and Congress can evaluate the net effect of all the proposed changes?
16. Regarding the section " Dismissal of Litigation, Waiver of Claims," one of the stakeholders at last week's workshops asked for more details on the written agreement to dismiss and an opportunity to review its terms and conditions. Will such materials be made available to the public as part of this review process and, if so, when?

We appreciate your providing this opportunity to review and comment on the July 17th draft. We look forward to hearing your responses to the above questions.

Sincerely,



Gary Bobker
The Bay Institute



Hamilton Candee
Natural Resources Defense Council

cc: Barbara Geigle, Solicitor's Office, US Department of the Interior
Steve Thompson, Regional Director, USFWS
Karen Schwinn, US EPA
Russ Strach, NOAA Fisheries
Theresa Presser, USGS
Stephen Macfarlane, US Department of Justice
Lester Snow, Director, DWR
Tam Doduc, Chair, State Water Resources Control Board
Dan Nelson, San Luis Delta Mendota Water Authority
Tom Birmingham, Westlands Water District

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Steve Chedester, SJ River Exchange Contractors
Jeff Kightlinger, Metropolitan Water District
Greg Gartrell, Contra Costa Water District
Joan Maher, Santa Clara Valley Water District
John Kopchik, Contra Costa County
John Herrick, South Delta Water Agency
Dante Nomellini, Central Delta Water Agency
Zeke Grader, PCFFA
Ann Hayden, Spreck Rosekrans, Environmental Defense
Michael Jackson, Lisa Coffman, C-WIN
John Beuttler, California Sportfishing Protection Alliance
Jonas Minton, Charlotte Hodde, Planning and Conservation League
David Nesmith, Environmental Water Caucus

Attachment 1-D



MEMORANDUM

To: Senator Dianne Feinstein
Senator Barbara Boxer
Rep. Grace Napolitano
Rep. George Miller
Rep. Dennis Cardoza
Rep. Jim Costa
Rep. Mike Thompson

From: Hal Candee, Senior Attorney

Re: Initial Comments on Westlands' Outline of New Drainage Concept Proposal

Date: August 24, 2007

We appreciate the request made by Senator Feinstein, Congresswoman Napolitano and Congressman Costa at the end of Senator Feinstein's recent meeting in Washington, DC, that NRDC write up our initial reactions and concerns regarding the new approach to a drainage solution outlined at the meeting by Tom Birmingham of Westlands. I apologize for the delay in this response. We appreciate that the Bureau has invited the public to attend an open workshop on a key part of the Westlands proposal, i.e. the concept of a long term "settlement contract" in lieu of the previously-negotiated long term "water service contract" to be offered to all San Luis Unit contractors once a renewed consultation on OCAP has been completed. I suspect we and other members of the public will learn more about this new concept proposal at that workshop next week and at additional public workshops that will no doubt need to be held, and we may well have further comments at that point.

At the outset, I wish to echo the comments made by DWR, MWD and others at the recent meeting that the new approach is less problematic than the original title transfer and water right assignment approach that was the subject of earlier meetings this year. While it is regrettable that so much time was spent this spring and fall on the details of that original approach, we share the consensus view that setting it aside was the right decision.

Nevertheless, as I indicated in my brief comments in Washington, the new approach still raises very significant issues of concern. We appreciated Senator Feinstein's recognition of that fact in her statements after the meeting, and the commitment of all parties to seek out the views of EPA, FWS, state water quality officials, and affected

third parties (including fishing and conservation groups) before moving forward on the new approach.

Overview of NRDC Concerns with New Approach

The CVP is the largest reclamation project in the country and the largest water project in California. Westlands is by far the largest single contractor in the CVP and the largest recipient of water exported from the beleaguered San Francisco Bay-Delta Estuary. We presume that Westlands is also currently paying the largest single share of the CVP's capital costs, O&M costs, and CVPIA restoration costs. Thus, it is perhaps obvious that any proposal to alter the terms and conditions of water exports to Westlands, and payments back to the government by Westlands, are of enormous public interest and concern throughout California. Indeed, the limited outline that has so far been provided on the new Westlands proposal implies changes in each of these key terms and conditions that would have ripple effects throughout the Bay-Delta watershed and on numerous state and local agencies.

What may be less obvious is that this entire exercise may be based on an incorrect premise. As a party to the pending litigation that gave rise to Interior's Record of Decision and the initial discussions of an "alternative concept," we are acutely aware of the US Court of Appeals' holding about Interior's current obligations on drainage for the San Luis Unit. However, that reasoning was based on a 1960 law that now ALL parties concede has to be amended and updated by Congress in any event. Because the United States has almost exhausted its 1960 authorization ceiling for expenditures on drainage (and other measures) for the San Luis Unit, and will also need new appropriations from Congress to pay for any drainage actions it takes in the future, this entire discussion is not about what statutory obligations may have existed in the past but rather what policy choices Congress wants to make in the future as it decides whether to increase authorizations and appropriations for the San Luis Unit and its drainage problems. We commend the contractors and the Bureau for acknowledging that basic fact from the outset and seeking out the views of the environmental community, the State, the Members of the California Congressional Delegation, other water users, and others. However, we are not sure the discussions have reflected all of the options that are actually available to Congress as it considers this major policy decision.

We will have additional points to make about the options that we believe are available in that regard. For purposes of this memo, however, we will focus instead on identifying our initial concerns with the new Westlands proposal:

Specific Concerns with Westlands' Proposal:

1. A **60-year contract** is too long and unnecessary: many water users take on long-term debt that lasts beyond a particular contract period, so the argument that Westlands' landowners must have more than double the contract length of any other agricultural water service contractor is not compelling. Those same contractors are already being offered a \$460 million rebate on their unpaid capital (while keeping the benefits of that enormous federal investment in their infrastructure and water delivery system), so they already have incentives for this deal. Indeed, depending on how the legislation is drafted, everything about the contract being offered to them is a new benefit, so an excessive contract period is simply unwarranted and inconsistent with all previous reclamation laws, especially CVPIA. Also any attempt to "lock in" the water quantity amounts and the proposal to inhibit state and federal authority to reduce Delta exports to protect the public interest (in particular for endangered fish species protection and drinking water quality protection) are problematic under any scenario, but unconscionable for a 60-year contract. What if half of Westlands Water District has gone out of agricultural production in 60 years – why should they still have this heavily subsidized contract for massive amounts of water? And what if the drainage solution Westlands has pursued has not been successful, yet they already have the contract in place? Adding an automatic right to a second 60 year contract at the end of the first term takes the proposal to even more extreme limits. While we are not opposed to considering modifications to the current Westlands contract proposal as part of an overall package that truly solves the drainage problem, this initial offering is extreme and unwarranted.
2. Waiving the **federal acreage limits** on the size of farms eligible for taxpayer-subsidized water would be particularly troubling in Westlands, the site of the worst abuses of this minimal regulatory system over the past 40 years. It is particularly inappropriate given that the Westlands contract is just now expiring, since under its terms the 1982 Reclamation Reform Act delayed some of the full implementation of the new acreage limits until existing contracts had expired. Hence, it appears that congressional reforms adopted in 1982 have never been fully implemented in Westlands, yet this new proposal would waive many of those reforms altogether in the area with some of the largest farms. Nevertheless the entire benefit of the subsidized CVP infrastructure would remain with the District and its growers. This entire proposal to exempt Westlands from the modest pricing reforms of 1982 is striking given the statements and documents provided by Westlands that they apparently have the financial capacity to undertake hundreds of millions of dollars of new financial costs.
3. The **proposal to limit the ability of the state and federal governments to reduce Delta exports to Westlands** without full "replacement" or "compensation" is a recipe for further harm to the fragile Bay-Delta estuary and its declining fish species. There is already a fisheries crisis in the Delta without "hardening" the supplies to the CVP's largest customer. Also the Environmental Water Account that was supposed to provide "replacement/compensation" water in such instances is already underfunded and too small to cover existing regulatory needs. Finally, this part of the proposal

appears to amend numerous federal laws (e.g. CVPIA) that do not currently require such compensation, and could override and preempt numerous state laws (e.g. the public trust doctrine) that also do not require such compensation.

4. The proposal to reduce the amount of **Operation & Maintenance (O&M) charges** that Westlands pays to the CVP (without any corresponding increase in other contractors' payments) is a prescription for new annual operating deficits in the CVP, and an implied repeal of key elements of 3-4 federal laws (the 1992 CVPIA, the 1982 RRA, the 1986 law approving the Coordinated Operations Agreement, and the 1939 Reclamation Projects Act requiring full O&M payments from the beginning of the CVP).

5. The **quantity of water** being requested by Westlands in the 60-year contract is excessive. Although the amount is less than Westlands' current "entitlement" (to use the District's terminology), the combined effect of past cutbacks, current Delta crises, future land retirement, and proposed regulatory assurances and protections makes this new proposed contract overly generous to the few hundred farming operations in Westlands. It is worth recalling that the more than 800,000 acre feet that Westlands is seeking to lock in by this long term agreement is enough water for more than five million Californians.

6. The **drainage part of the proposal** still has numerous problems: the Solar Evaporators are still not adequately tested on the new proposed scale and, as many parties noted at the recent meeting, questions of assurances and mitigation must be answered. Similarly, the proposed biotreatment is not guaranteed on this new massive scale of disposal and treatment, and it raises issues about selenium concentrations that must be addressed; the amount of acreage to be retired is less than 1/3 of the amount identified as optimal in the Bureau's own Final EIS and is clearly inadequate to address all the potential problems raised by a 60-year Westlands contract, and the linkage between the drainage proposals and the rest of the Westlands "package" above remain a serious concern. The amount of contaminated drainage water will be much larger than envisaged in the Bureau's Final EIS because of the lower amount of land retirement, requiring more treatment and disposal actions than were addressed in the Bureau's preferred alternative.

There are other issues that we have raised in our three previous comment letters that remain at issue in the new proposal. We hope there will be an opportunity to discuss those concerns with Bureau staff in the weeks ahead. We appreciate your requesting and considering our views, and we look forward to continuing the dialogue on this issue of major public concern.

Attachment 1-E

RECLAMATION

Managing Water in the West

Delta-Mendota Canal Water Quality Monitoring Program

Monthly Report of Flows, Concentrations and Loads
April 2007



Sigma Autosampler at DMC Check 21, near Mendota, California



U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

June 21, 2007

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

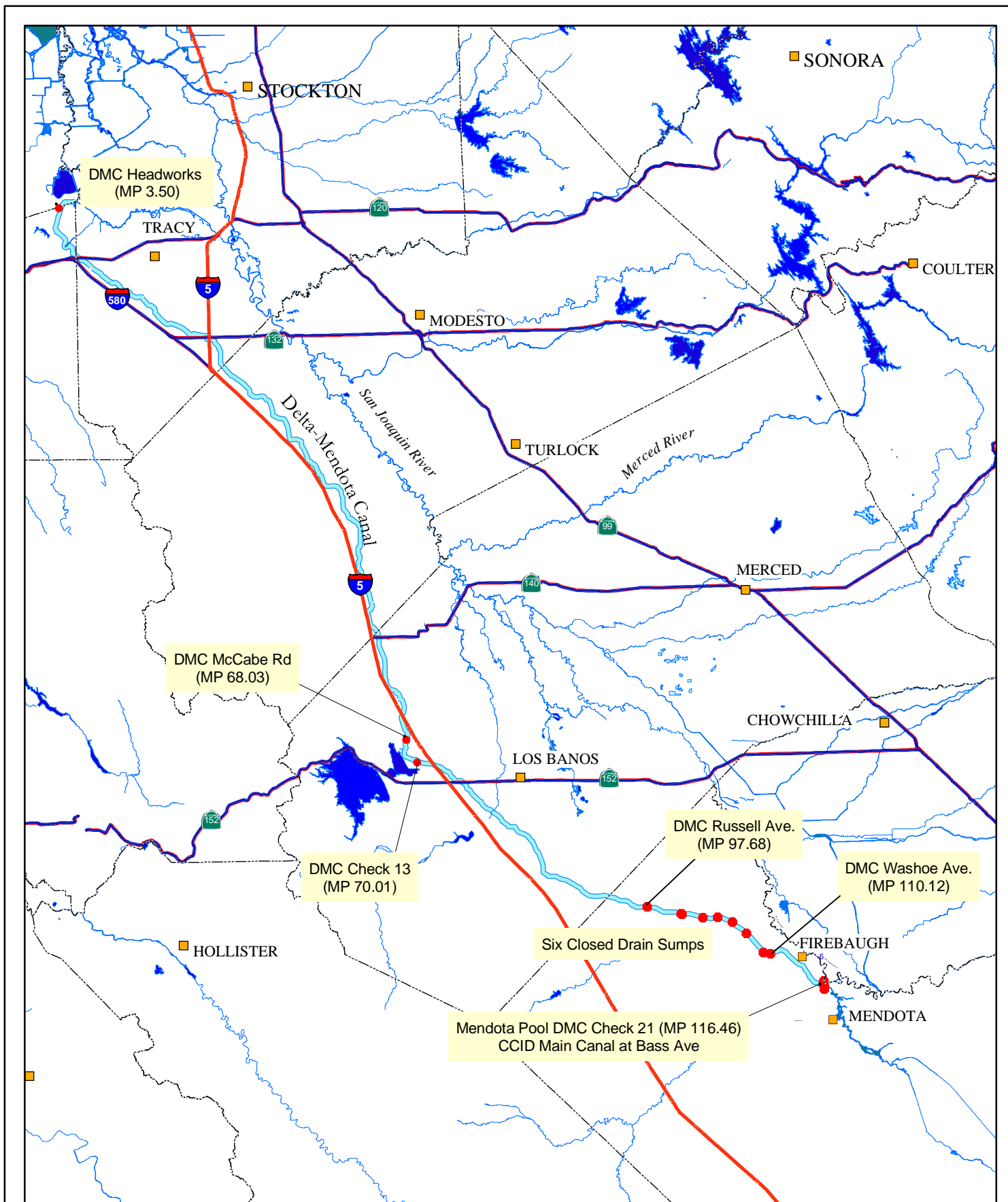


Figure 1.
Delta Mendota Canal
Water Quality Monitoring Sites



Delta-Mendota Canal Water Quality Monitoring Program

April 2007

Table 1. Continuous water quality monitoring near the DMC Headworks near Tracy (MP 3.50)

	Mean Daily Flow cfs	Specific Conductance µS/cm	Total Dissolved Solids (1) mg/L	Salt Load tons/day	Total Selenium µg/L	Selenium value used for load calculation µg/L	Selenium Load computed pounds/day
April 1, 2007	3,347	NA			NA		
April 2, 2007	3,590	777	435	4,214	0.9	0.9	17.4
April 3, 2007	3,589	NA			NA		
April 4, 2007	3,581	NA			NA		
April 5, 2007	3,573	NA			NA		
April 6, 2007	3,572	412	241	2,320	<0.4	0.2	3.9
April 7, 2007	3,562	501	288	2,769	0.5	0.5	9.6
April 8, 2007	3,604	455	264	2,564	0.4	0.4	7.8
April 9, 2007	3,600	429	250	2,426	0.8	0.8	15.5
April 10, 2007	3,584	460	266	2,575	0.6	0.6	11.6
April 11, 2007	3,577	450	261	2,518	<0.4	0.2	3.9
April 12, 2007	3,593	438	255	2,468	0.5	0.5	9.7
April 13, 2007	3,555	475	274	2,631	<0.4	0.2	3.8
April 14, 2007	3,542	429	250	2,387	0.6	0.6	11.5
April 15, 2007	3,561	426	248	2,385	<0.4	0.2	3.8
April 16, 2007	3,556	467	270	2,591	0.4	0.4	7.7
April 17, 2007	3,519	NA			NA		
April 18, 2007	3,573	NA			NA		
April 19, 2007	3,564	NA			NA		
April 20, 2007	3,016	387	227	1,851	0.4	0.4	6.5
April 21, 2007	2,797	347	206	1,556	<0.4	0.2	3.0
April 22, 2007	1,538	324	194	805	<0.4	0.2	1.7
April 23, 2007	1,006	359	213	577	<0.4	0.2	1.1
April 24, 2007	1,002	437	254	687	0.5	0.5	2.7
April 25, 2007	464	471	272	341	0.5	0.5	1.3
April 26, 2007	852	529	303	696	0.7	0.7	3.2
April 27, 2007	846	463	268	612	<0.4	0.2	0.9
April 28, 2007	847	432	251	574	0.4	0.4	1.8
April 29, 2007	851	407	238	546	<0.4	0.2	0.9
April 30, 2007	851	379	223	512	<0.4	0.2	0.9

Mean flow (cfs) 2,724

Total (acre-feet) 162,070

Flow weighted monthly specific conductance (µS/cm) 456

Flow weighted monthly total dissolved solids (mg/L) 264

Total monthly salt load (tons) 58,240

Flow weighted monthly selenium concentration (µg/L) 0.4

Estimated monthly total (pounds) 187

Data Sources:

SLDMWA

Reclamation

calculated

calculated

Reclamation

calculated

calculated

Notes:

(1) SC => TDS conversion factor = $0.5325 \cdot \text{SC} + 21.4$

No sample April 1; sampler malfunction. No sample April 3-5; bottle <1/2 full. No sample April 17-18; power outage. No sample April 19; bottle <1/2 full.

Table 2. Continuous water quality monitoring at DMC Check 13 at O'Neill Forebay (MP 70.01)

	Mean Daily Flow cfs	Specific Conductance µS/cm	Total Dissolved Solids (1) mg/L	Salt Load tons/day	Total Selenium µg/L	Selenium value used for load calculation µg/L	Selenium Load computed pounds/day
April 1, 2007	1,000	512	293	791	<0.4	0.2	1.1
April 2, 2007	1,150	519	297	921	<0.4	0.2	1.2
April 3, 2007	1,150	476	274	850	<0.4	0.2	1.2
April 4, 2007	1,150	478	275	854	<0.4	0.2	1.2
April 5, 2007	1,030	458	265	735	<0.4	0.2	1.1
April 6, 2007	1,030	446	258	717	<0.4	0.2	1.1
April 7, 2007	1,030	441	255	710	<0.4	0.2	1.1
April 8, 2007	1,230	437	253	841	<0.4	0.2	1.3
April 9, 2007	1,400	456	263	995	<0.4	0.2	1.5
April 10, 2007	1,500	444	257	1,040	<0.4	0.2	1.6
April 11, 2007	1,500	459	265	1,072	<0.4	0.2	1.6
April 12, 2007	1,700	478	275	1,262	<0.4	0.2	1.8
April 13, 2007	1,520	416	242	993	<0.4	0.2	1.6
April 14, 2007	1,320	448	259	923	<0.4	0.2	1.4
April 15, 2007	1,220	420	244	804	<0.4	0.2	1.3
April 16, 2007	1,050	437	253	718	<0.4	0.2	1.1
April 17, 2007	1,050	402	235	665	<0.4	0.2	1.1
April 18, 2007	1,250	455	263	887	<0.4	0.2	1.3
April 19, 2007	1,250	395	231	779	<0.4	0.2	1.3
April 20, 2007	1,030	436	253	702	0.5	0.5	2.8
April 21, 2007	930	422	245	616	0.5	0.5	2.5
April 22, 2007	705	318	190	361	<0.4	0.2	0.8
April 23, 2007	900	495	284	690	0.6	0.6	2.9
April 24, 2007	850	357	211	483	<0.4	0.2	0.9
April 25, 2007	1,000	369	217	586	<0.4	0.2	1.1
April 26, 2007	1,180	331	197	627	<0.4	0.2	1.3
April 27, 2007	1,180	399	233	742	<0.4	0.2	1.3
April 28, 2007	1,030	457	264	733	<0.4	0.2	1.1
April 29, 2007	1,030	383	225	624	<0.4	0.2	1.1
April 30, 2007	1,250	400	234	788	<0.4	0.2	1.3

Mean flow (cfs) 1,154

Total (acre-feet) 68,660

Flow weighted monthly specific conductance (µS/cm) 434

Flow weighted monthly total dissolved solids (mg/L) 253

Total monthly salt load (tons) 23,580

Flow weighted monthly selenium concentration (µg/L) 0.2

Estimated monthly total (pounds) 42

Data Sources:

SLDMWA

Reclamation / CVO

calculated

calculated

Reclamation

calculated

calculated

Notes:

(1) SC => TDS conversion factor =

0.5317*SC + 21.0

Delta-Mendota Canal Water Quality Monitoring Program
April 2007
Table 3. Continuous water quality monitoring, DMC Check 21 at Bass Avenue (MP 116.48)

	Mean Daily Flow DMC Check 21 cfs	Firebaugh Wasteway cfs	Specific Conductance µS/cm	Total Dissolved Solids (1) mg/L	Salt Load tons/day	Total Selenium µg/L	Selenium value used for load calculation µg/L	Selenium Load computed pounds/day
April 1, 2007	700		556	317	598	1.8	1.8	6.8
April 2, 2007	950		563	321	821	1.5	1.5	7.7
April 3, 2007	950		NA			NA		
April 4, 2007	950		586	333	852	1.3	1.3	6.7
April 5, 2007	850		538	307	705	1.1	1.1	5.0
April 6, 2007	850		546	312	715	1.1	1.1	5.0
April 7, 2007	850		507	291	668	1.2	1.2	5.5
April 8, 2007	1,050		524	300	850	1.3	1.3	7.4
April 9, 2007	1,200		479	276	895	1.3	1.3	8.4
April 10, 2007	1,300		511	293	1,028	1.2	1.2	8.4
April 11, 2007	1,300		483	279	977	1.1	1.1	7.7
April 12, 2007	1,400		499	287	1,084	1.2	1.2	9.1
April 13, 2007	1,200		512	294	951	0.9	0.9	5.8
April 14, 2007	1,050		567	323	914	0.8	0.8	4.5
April 15, 2007	950		383	226	579	1.1	1.1	5.6
April 16, 2007	800		495	285	615	1.4	1.4	6.0
April 17, 2007	800		513	294	635	1.5	1.5	6.5
April 18, 2007	950		528	302	774	1.7	1.7	8.7
April 19, 2007	950		501	288	738	1.6	1.6	8.2
April 20, 2007	800		482	278	600	1.6	1.6	6.9
April 21, 2007	700		519	297	562	1.5	1.5	5.7
April 22, 2007	525		483	279	394	1.5	1.5	4.2
April 23, 2007	750		420	245	497	1.6	1.6	6.5
April 24, 2007	750		514	295	596	1.8	1.8	7.3
April 25, 2007	850		472	273	625	1.5	1.5	6.9
April 26, 2007	950		437	254	652	1.4	1.4	7.2
April 27, 2007	950		452	262	672	1.2	1.2	6.2
April 28, 2007	800		408	239	516	1.0	1.0	4.3
April 29, 2007	800		372	220	475	0.9	0.9	3.9
April 30, 2007	1,000		417	244	658	1.0	1.0	5.4
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Mean flow (cfs)	931	0						
Total (acre-feet)	55,390	0						
Average monthly specific conductance (µS/cm)			493					
Average monthly total dissolved solids (mg/L)				284				
Total monthly salt load (tons)					21,380			
Average monthly selenium concentration (µg/L)							1.3	
Estimated monthly total (pounds)								194
<hr/>								
Data Sources:	SLDMWA		Reclamation	calculated	calculated	Reclamation	calculated	calculated
Notes:	(1) SC => TDS conversion factor = No releases to Firebaugh Wasteway							
				0.5252*SC + 24.87				

Table 4. Continuous water quality monitoring on the CCID Main Canal at Bass Ave

	Mean Daily Flow cfs	Specific Conductance µS/cm	Total Dissolved Solids (1) mg/L	Salt Load tons/day	Total Selenium µg/L	Selenium value used for load calculation µg/L	Selenium Load computed pounds/day
April 1, 2007	558	617	348	524	0.8	0.8	2.4
April 2, 2007	575	535	305	472	0.9	0.9	2.8
April 3, 2007	507	554	315	430	0.8	0.8	2.2
April 4, 2007	553	520	297	443	0.6	0.6	1.8
April 5, 2007	537	570	324	468	0.6	0.6	1.7
April 6, 2007	485	665	374	489	0.8	0.8	2.1
April 7, 2007	523	507	290	409	0.7	0.7	2.0
April 8, 2007	474	440	255	325	0.9	0.9	2.3
April 9, 2007	506	432	250	341	0.8	0.8	2.2
April 10, 2007	482	488	280	364	0.7	0.7	1.8
April 11, 2007	486	490	281	368	0.8	0.8	2.1
April 12, 2007	509	501	287	394	0.8	0.8	2.2
April 13, 2007	553	596	337	502	1.0	1.0	3.0
April 14, 2007	372	557	317	317	0.9	0.9	1.8
April 15, 2007	498	444	257	344	0.7	0.7	1.9
April 16, 2007	494	599	339	451	1.0	1.0	2.7
April 17, 2007	514	395	231	319	0.9	0.9	2.5
April 18, 2007	489	463	267	352	1.0	1.0	2.6
April 19, 2007	475	507	290	371	0.7	0.7	1.8
April 20, 2007	496	506	290	387	0.7	0.7	1.9
April 21, 2007	482	502	288	373	0.7	0.7	1.8
April 22, 2007	403	515	294	319	0.7	0.7	1.5
April 23, 2007	506	443	256	349	0.7	0.7	1.9
April 24, 2007	464	499	286	357	0.9	0.9	2.3
April 25, 2007	418	485	279	313	0.8	0.8	1.8
April 26, 2007	453	403	235	287	0.7	0.7	1.7
April 27, 2007	399	512	293	315	0.8	0.8	1.7
April 28, 2007	367	407	237	234	0.7	0.7	1.4
April 29, 2007	406	391	229	250	0.6	0.6	1.3
April 30, 2007	473	402	235	298	0.7	0.7	1.8
<hr/>							
Mean flow (cfs)	482						
Total (acre-feet)	28,680						
Flow weighted monthly specific conductance (µS/cm)		501					
Flow weighted monthly total dissolved solids (mg/L)			288				
Total monthly salt load (tons)				11,230			
Flow weighted monthly selenium concentration (µg/L)						0.8	
Estimated monthly total (pounds)							61

Data Sources:

SJRECWA

Reclamation

calculated

calculated

Reclamation

calculated

calculated

Notes:

(1) SC => TDS conversion factor =

0.5296*SC + 21.67

Sample Site: DMC Milepost: Units:	Sump A & B MP 100.86 cfs	Sump C MP 102.86 cfs	Sump D & E MP 104.19 cfs	Sump F & G MP 105.60 cfs	Sump H & J MP 107.24 cfs	Sump K MP 109.50 cfs	Combined Sumps		
							cfs	acre-feet per day	acre-feet per month
April 5, 2006	0.36	0.06	0.72	0.29	0.44	0.07	1.94	3.84	
April 12, 2006	0.16	0.05	0.53	0.15	0.36	0.09	1.34	2.65	
April 18, 2006	0.30	0.06	0.73	0.38	0.46	0.00	1.94	3.86	
April 26, 2006	0.21	0.04	0.33	0.17	0.30	0.08	1.13	2.23	94
May 1, 2006	0.37	0.08	0.95	0.41	0.59	0.11	2.51	4.97	
May 11, 2006	0.17	0.05	0.51	0.25	0.30	0.05	1.34	2.66	
May 16, 2006	0.00	0.09	0.77	0.39	0.53	0.09	1.86	3.70	
May 25, 2006	0.36	0.05	0.59	0.25	0.35	0.08	1.68	3.33	
May 31, 2006	0.43	0.01	0.61	0.25	0.36	0.04	1.70	3.37	112
June 6, 2006	0.35	0.08	0.37	0.31	0.25	0.08	1.45	2.87	
June 12, 2006	0.46	0.11	0.51	0.40	0.33	0.12	1.92	3.81	
June 20, 2006	0.36	0.07	0.40	0.27	0.27	0.10	1.47	2.91	
June 26, 2006	0.46	0.10	0.50	0.37	0.33	0.13	1.90	3.77	100
July 4, 2006	0.41	0.10	0.45	0.38	0.30	0.13	1.78	3.53	
July 11, 2006	0.35	0.08	0.38	0.32	0.25	0.11	1.49	2.96	
July 17, 2006	0.44	0.05	0.45	0.38	0.30	0.12	1.75	3.47	
July 24, 2006	0.44	0.01	0.51	0.43	0.33	0.13	1.86	3.68	106
August 1, 2006	0.42	0.10	0.46	0.39	0.30	0.11	1.79	3.54	
August 8, 2006	0.40	0.10	0.43	0.38	0.29	0.12	1.71	3.40	
August 15, 2006	0.48	0.11	0.52	0.45	0.35	0.15	2.05	4.07	
August 23, 2006	0.34	0.08	0.37	0.31	0.25	0.10	1.45	2.87	
August 28, 2006	0.47	0.11	0.50	0.45	0.34	0.11	1.99	3.94	110
September 6, 2006	0.37	0.08	0.39	0.32	0.22	0.08	1.46	2.89	
September 12, 2006	0.44	0.09	0.46	0.38	0.31	0.09	1.76	3.48	
September 19, 2006	0.41	0.06	0.44	0.31	0.31	0.08	1.61	3.20	
September 26, 2006	0.30	0.11	0.43	0.32	0.33	0.08	1.58	3.14	95
October 4, 2006	0.21	0.08	0.38	0.26	0.30	0.07	1.30	2.58	
October 11, 2006	0.19	0.05	0.31	0.21	0.25	0.06	1.06	2.11	
October 17, 2006	0.17	0.06	0.36	0.25	0.31	0.06	1.21	2.40	
October 24, 2006	0.18	0.05	0.34	0.22	0.29	0.06	1.12	2.23	
October 31, 2006	0.17	0.07	0.28	0.11	0.17	0.06	0.85	1.69	68
November 6, 2006	0.03	0.03	0.30	0.17	0.44	0.06	1.03	2.03	
November 14, 2006	0.09	0.00	0.01	0.17	0.28	0.05	0.59	1.18	
November 20, 2006	0.13	0.00	0.00	0.20	0.11	0.05	0.49	0.97	
November 28, 2006	0.13	0.00	0.00	0.19	0.37	0.05	0.74	1.47	42
December 6, 2006	0.08	0.00	0.00	0.15	0.32	0.05	0.59	1.17	
December 13, 2006	0.15	0.00	0.00	0.16	0.24	0.05	0.59	1.17	
December 20, 2006	0.09	0.09	0.00	0.18	0.13	0.06	0.55	1.09	
December 28, 2006	0.13	0.05	0.00	0.14	0.34	0.06	0.71	1.41	36
January 4, 2007	0.00	0.03	0.00	0.10	0.15	0.00	0.28	0.57	
January 9, 2007	0.13	0.05	0						

Summary of DDMC data: March 1997 - Present									
Sample Site:	Sump A & B	Sump C	Sump D & E	Sump F & G	Sump H & J	Sump K	Combined Sumps		
DMC Milepost:	MP 100.86	MP 102.86	MP 104.19	MP 105.60	MP 107.24	MP 109.50	acre-feet	acre-feet	
Units:	cfs	cfs	cfs	cfs	cfs	cfs	cfs	per day	per month
Maximum	1.82	0.80	1.71	1.72	1.30	1.26	4.92	9.75	218
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.57	36
Median	0.31	0.11	0.28	0.34	0.38	0.05	1.64	3.25	108
Average	0.33	0.15	0.34	0.40	0.42	0.07	1.68	3.33	110
Number of readings	426	409	428	421	425	421	429	429	58
Data Sources:	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	calculated	calculated	calculated

Data Sources:	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	calculated	calculated	calculated
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Sample Site: DMC Milepost: Units:	Sump A & B MP 100.86 µg/L	Sump C MP 102.86 µg/L	Sump D & E MP 104.19 µg/L	Sump F & G MP 105.60 µg/L	Sump H & J MP 107.24 µg/L	Sump K MP 109.50 µg/L	Flow-weighted concentration µg/L	Month Average µg/L
April 5, 2006	230	380	150	92	210	610	194	222
April 12, 2006	550	390	170	94	220	420	244	
April 18, 2006	280	340	170	92	210	640	187	
April 26, 2006	290	370	180	87	220	1,000	258	
May 1, 2006	480	340	180	90	220	630	244	
May 11, 2006	230	380	180	87	220	670	204	
May 16, 2006	240	330	190	90	220	680	208	205
May 25, 2006	NA	340	190	89	210	670	165	
May 31, 2006	230	330	200	89	210	690	206	
June 6, 2006	250	270	210	90	220	700	226	
June 12, 2006	250	350	210	91	210	270	206	219
June 20, 2006	260	350	200	93	220	470	223	
June 26, 2006	250	360	160	90	220	580	219	
July 4, 2006	210	340	110	87	220	530	190	
July 11, 2006	220	370	170	82	240	520	210	
July 17, 2006	200	390	150	77	220	530	192	
July 24, 2006	210	NA	140	75	220	250	163	189
August 1, 2006	190	290	130	71	210	530	178	
August 8, 2006	220	370	140	76	210	560	199	
August 15, 2006	180	360	140	74	220	420	181	
August 23, 2006	200	370	130	76	220	410	183	186
August 28, 2006	220	390	160	78	230	320	190	
September 6, 2006	210	370	190	80	230	470	201	
September 12, 2006	210	390	180	85	230	550	204	
September 19, 2006	230	390	190	85	230	500	210	
September 26, 2006	230	400	190	83	220	410	208	
October 4, 2006	400	400	200	84	230	430	240	206
October 11, 2006	480	380	200	84	230	330	249	
October 17, 2006	520	470	200	87	230	200	243	
October 24, 2006	510	390	210	82	240	290	253	
October 31, 2006	410	420	200	84	230	540	272	
November 6, 2006	270	410	200	NA	230	390	200	
November 14, 2006	280	NA	200	86	220	590	224	251
November 20, 2006	500	NA	NA	85	220	370	257	
November 28, 2006	530	NA	NA	88	360	580	337	
December 6, 2006	530	NA	NA	85	240	560	263	
December 13, 2006	250	NA	NA	96	240	93	192	
December 20, 2006	220	NA	NA	85	210	480	168	
December 28, 2006	490	390	NA	85	330	570	332	239
January 4, 2007	420	410	NA	84	220	NA	196	
January 9, 2007	510	390	NA	92	210	NA	247	
January 16, 2007	550	410	NA	90	220	390	303	
January 23, 2007	230	420	NA	88	220	440	198	
January 30, 2007	230	500	NA	90	230	NA	163	
February 6, 2007	270	400	230	89	210	230	279	221
February 14, 2007	180	460	200	90	210	560	273	
February 21, 2007	170	410	150	89	210	430	242	
February 28, 2007	150	370	160	80	210	610	260	
March 6, 2007	160	390	140	86	210	460	258	
March 12, 2007	170	390	170	89	210	440	252	
March 19, 2007	210	390	170	87	210	310	255	272
March 27, 2007	450	430	180	87	210	350	3	

Sample Site:	Sump A & B	Sump C	Sump D & E	Sump F & G	Sump H & J	Sump K	Combined Sumps	
DMC Milepost:	MP 100.86	MP 102.86	MP 104.19	MP 105.60	MP 107.24	MP 109.50		
Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Maximum	870	940	450	320	510	2,000	399	399
Minimum	100	170	86	43	71	90	79	79
Median	240	340	180	90	230	550	205	209
Average	303	365	179	95	238	605	212	213
Number of measurements	344	333	341	330	349	345	353	164
Data Sources:	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	calculated	

[illegible]

Table 5c. Estimated Loads of Selenium Discharged into the Delta-Mendota Canal from the Sumps near Firebaugh, California

Sample Site:	Sump A & B	Sump C	Sump D & E	Sump F & G	Sump H & J	Sump K	Combined Sumps	
DMC Milepost:	MP 100.86	MP 102.86	MP 104.19	MP 105.60	MP 107.24	MP 109.50		
Units:	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/month
April 5, 2006	0.4	0.1	0.6	0.1	0.5	0.2	2.0	
April 12, 2006	0.5	0.1	0.5	0.1	0.4	0.2	1.8	
April 18, 2006	0.5	0.1	0.7	0.2	0.5	0.0	2.0	
April 26, 2006	0.3	0.1	0.3	0.1	0.4	0.4	1.6	55
May 1, 2006	1.0	0.1	0.9	0.2	0.7	0.4	3.3	
May 11, 2006	0.2	0.1	0.5	0.1	0.4	0.2	1.5	
May 16, 2006	0.0	0.2	0.8	0.2	0.6	0.3	2.1	
May 25, 2006		0.1	0.6	0.1	0.4	0.3	1.5	
May 31, 2006	0.5	0.0	0.7	0.1	0.4	0.1	1.9	64
June 6, 2006	0.5	0.1	0.4	0.2	0.3	0.3	1.8	
June 12, 2006	0.6	0.2	0.6	0.2	0.4	0.2	2.1	
June 20, 2006	0.5	0.1	0.4	0.1	0.3	0.2	1.8	
June 26, 2006	0.6	0.2	0.4	0.2	0.4	0.4	2.2	59
July 4, 2006	0.5	0.2	0.3	0.2	0.4	0.4	1.8	
July 11, 2006	0.4	0.2	0.3	0.1	0.3	0.3	1.7	
July 17, 2006	0.5	0.1	0.4	0.2	0.4	0.4	1.8	
July 24, 2006	0.5		0.4	0.2	0.4	0.2	1.6	54
August 1, 2006	0.4	0.2	0.3	0.2	0.3	0.3	1.7	
August 8, 2006	0.5	0.2	0.3	0.2	0.3	0.4	1.8	
August 15, 2006	0.5	0.2	0.4	0.2	0.4	0.3	2.0	
August 23, 2006	0.4	0.2	0.3	0.1	0.3	0.2	1.4	
August 28, 2006	0.6	0.2	0.4	0.2	0.4	0.2	2.0	56
September 6, 2006	0.4	0.2	0.4	0.1	0.3	0.2	1.6	
September 12, 2006	0.5	0.2	0.4	0.2	0.4	0.3	1.9	
September 19, 2006	0.5	0.1	0.4	0.1	0.4	0.2	1.8	
September 26, 2006	0.4	0.2	0.4	0.1	0.4	0.2	1.8	53
October 4, 2006	0.4	0.2	0.4	0.1	0.4	0.2	1.7	
October 11, 2006	0.5	0.1	0.3	0.1	0.3	0.1	1.4	
October 17, 2006	0.5	0.1	0.4	0.1	0.4	0.1	1.6	
October 24, 2006	0.5	0.1	0.4	0.1	0.4	0.1	1.5	
October 31, 2006	0.4	0.2	0.3	0.1	0.2	0.2	1.3	46
November 6, 2006	0.0	0.1	0.3		0.5	0.1	1.1	
November 14, 2006	0.1		0.0	0.1	0.3	0.2	0.7	
November 20, 2006	0.4			0.1	0.1	0.1	0.7	
November 28, 2006	0.4			0.1	0.7	0.2	1.3	29
December 6, 2006	0.2			0.1	0.4	0.1	0.8	
December 13, 2006	0.2			0.1	0.3	0.0	0.6	
December 20, 2006	0.1			0.1	0.1	0.2	0.5	
December 28, 2006	0.3	0.1		0.1	0.6	0.2	1.3	25
January 4, 2007	0.0	0.1		0.0	0.2		0.3	
January 9, 2007	0.3	0.1		0.1	0.4		0.9	
January 16, 2007	0.5	0.1		0.1	0.4	0.2	1.3	
January 23, 2007	0.2	0.0		0.1	0.3	0.1	0.8	
January 30, 2007	0.3	0.3		0.0	0.4		1.0	26
February 6, 2007	0.7	1.4	0.6	0.1	0.4	0.1	3.3	
February 14, 2007	0.4	1.2	0.5	0.1	0.3	0.2	2.7	
February 21, 2007	0.4	1.2	0.4	0.1	0.3	0.1	2.5	
February 28, 2007	0.3	1.4	0.3	0.1	0.3	0.3	2.6	77
March 6, 2007	0.3	1.6	0.3	0.1	0.3	0.1	2.7	
March 12, 2007	0.4	1.4	0.4	0.1	0.3	0.1	2.5	
March 19, 2007	0.4	1.4	0.4	0.1	0.3	0.1	2.9	
March 27, 2007	1.0	1.7	0.5	0.1	0.3	0.1	3.8	92
April 4, 2007	0.4	1.7	0.5	0.0	0.3	0.1	3.0	
April 11, 2007	0.3	1.4	0.4		0.3	0.2	2.6	
April 17, 2007	0.2	1.7	0.5	0.1	0.3	0.1	2.9	
April 24, 2007	0.4	1.7	0.5	0.1	0.4	0.2	3.3	91

Summary of USBR data: March 1987 - Present

Sample Site:	Sump A & B	Sump C	Sump D & E	Sump F & G	Sump H & J	Sump K	Combined Sumps	
DMC Milepost:	MP 100.86	MP 102.86	MP 104.19	MP 105.60	MP 107.24	MP 109.50		
Units:	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/month
Maximum	2.9	1.7	1.8	1.4	1.8	3.3	6.4	193
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.3	13
Median	0.4	0.2	0.3	0.2	0.5	0.1	1.8	54
Average	0.4	0.3	0.4	0.2	0.5	0.2	1.9	57
Number of samples	354	346	341	351	355	350	355	232
Data Sources:	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	Reclamation	calculated	calculated

Table 5d. Electrical Conductivity in Ground Water Discharged into the Delta-Mendota Canal from the Sumps near Firebaugh, California

Sample Site: DMC Milepost: Units:	Sump A & B MP 100.86 µS/cm	Sump C MP 102.86 µS/cm	Sump D & E MP 104.19 µS/cm	Sump F & G MP 105.60 µS/cm	Sump H & J MP 107.24 µS/cm	Sump K MP 109.50 µS/cm	Flow-weighted Concentration Week µS/cm	Month µS/cm
April 5, 2006	7,027	10,085	5,847	6,983	7,373	9,968	6,869	
April 12, 2006	11,481	10,285	6,517	7,359	7,509	8,639	7,740	
April 18, 2006	7,250	8,895	6,182	6,853	6,163	10,107	6,561	
April 26, 2006	8,218	9,829	6,702	7,175	7,545	14,069	7,879	7,298
May 1, 2006	10,377	9,248	6,620	6,993	7,339	10,551	7,663	
May 11, 2006	7,273	10,045	6,906	6,801	7,635	11,210	7,380	
May 16, 2006	7,249	8,795	6,891	6,963	7,482	10,800	7,350	
May 25, 2006	NA	9,063	6,984	6,991	7,442	10,964	5,842	
May 31, 2006	7,185	8,582	7,078	7,057	7,406	10,965	7,269	7,101
June 6, 2006	7,312	5,417	7,108	6,587	7,338	11,422	7,224	
June 12, 2006	7,626	8,909	7,164	7,008	7,345	7,200	7,374	
June 20, 2006	7,616	8,856	6,772	7,178	7,392	9,012	7,412	
June 26, 2006	7,303	9,249	5,752	6,879	7,339	9,847	7,101	7,276
July 4, 2006	6,373	8,451	5,644	6,491	7,065	9,346	6,661	
July 11, 2006	6,733	9,184	6,061	6,634	7,586	9,476	7,006	
July 17, 2006	6,510	10,005	5,620	6,377	7,340	9,746	6,715	
July 24, 2006	6,291	NA	5,216	6,153	7,247	7,301	6,161	6,729
August 1, 2006	6,057	6,581	5,102	5,748	7,145	9,674	6,182	
August 8, 2006	6,820	9,478	5,195	6,203	7,283	10,084	6,732	
August 15, 2006	5,955	9,175	5,186	6,256	7,230	8,339	6,387	
August 23, 2006	6,334	9,437	4,948	6,427	7,176	8,109	6,440	
August 28, 2006	6,622	9,605	5,677	6,093	7,350	7,432	6,602	6,469
September 6, 2006	6,472	9,004	6,484	6,550	7,444	8,849	6,907	
September 12, 2006	6,570	9,937	6,411	6,785	7,561	9,633	7,066	
September 19, 2006	6,917	10,078	6,466	6,777	7,573	9,191	7,126	
September 26, 2006	7,100	10,189	6,654	6,906	7,885	8,744	7,402	7,125
October 4, 2006	9,863	10,113	6,631	6,732	7,636	8,686	7,722	
October 11, 2006	10,399	9,791	6,589	6,727	7,509	7,831	7,722	
October 17, 2006	10,732	11,270	6,717	6,796	7,557	6,809	7,740	
October 24, 2006	10,778	9,807	6,650	6,899	7,638	7,557	7,799	
October 31, 2006	9,742	10,617	6,770	6,873	7,533	9,700	8,015	7,800
November 6, 2006	3,634	10,539	6,793	NA	7,646	8,637	6,184	
November 14, 2006	7,715	NA	6,793	7,046	7,530	10,113	7,639	
November 20, 2006	11,089	NA	NA	7,112	7,570	8,592	8,450	
November 28, 2006	11,011	NA	NA	6,884	9,412	10,228	9,111	7,846
December 6, 2006	11,058	NA	NA	7,007	7,595	9,936	8,082	
December 13, 2006	7,249	NA	NA	7,211	7,602	10,130	7,627	
December 20, 2006	7,033	NA	NA	6,937	7,470	9,499	6,220	
December 28, 2006	10,857	10,950	NA	7,199	9,456	11,040	9,477	7,852
January 4, 2007	10,021	10,909	NA	7,332	7,447	NA	7,828	
January 9, 2007	11,119	10,402	NA	7,152	7,352	NA	8,033	
January 16, 2007	10,705	9,858	NA	6,887	6,378	9,010	7,998	
January 23, 2007	7,120	10,725	NA	7,110	7,390	8,850	7,352	
January 30, 2007	6,897	11,654	NA	7,018	7,459	NA	5,030	7,248
February 6, 2007	7,560	9,719	6,974	7,167	7,354	5,260	7,915	
February 14, 2007	5,513	10,377	6,527	6,930	7,043	9,271	7,543	
February 21, 2007	5,517	9,945	5,486	6,945	7,486	8,458	7,287	
February 28, 2007	5,080	9,085	5,565	7,240	7,469	9,969	7,383	7,532
March 6, 2007	5,594	9,832	5,454	7,241	7,533	8,825	7,693	
March 12, 2007	5,734	9,497	6,019	7,000	7,310	8,358	7,455	
March 19, 2007	6,670	9,676	6,270	7,111	7,363	7,331	7,708	
March 27, 2007	10,127	10,431	6,497	7,075	7,478	7,907	8,780	7,909
April 4, 2007	7,143	9,969	6,827	7,338	7,495	9,267	8,407	
April 11, 2007	6,800	9,418	6,610	NA	7,058	10,064	7,337	
April 17, 2007	7,188	9,929	7,054	6,925	7,432	9,207	8,414	
April 24, 2007	6,770	9,661	8,778	7,133	7,359	10,011	8,502	8,165

Summary of USBR data: March 1987 - Present

Sample Site: DMC Milepost: Units:	Sump A & B MP 100.86 µS/cm	Sump C MP 102.86 µS/cm	Sump D & E MP 104.19 µS/cm	Sump F & G MP 105.60 µS/cm	Sump H & J MP 107.24 µS/cm	Sump K MP 109.50 µS/cm	Combined Sumps µS/cm	µS/cm
Maximum	12,530	13,770	8,778	11,890	10,370	18,900	9,867	8,941
Minimum	3,634	4,268	4,490	4,659	5,220	1,720	1,695	6,161
Median	7,312	8,977	6,454	7,075	7,460	9,883	7,337	7,127
Average	7,939	9,137	6,421	7,078	7,434	10,223	7,182	7,191
Number of samples	333	321	329	319	338	335	343	60

Data Sources: Reclamation Reclamation Reclamation Reclamation Reclamation Reclamation Reclamation calculated

Table 6. Concentration of Selenium in the Delta-Mendota Canal and Central California Irrigation District canals, grab samples

Sample Site: DMC Milepost: Units:	DMC McCabe Rd MP-68.03 µg/L	DMC Russell Ave MP-97.68 µg/L	DMC Telles Ranch MP-100.850 µg/L	DMC Washoe Ave MP-110.120 µg/L	DMC Bass Ave MP-116.48 µg/L	CCID Main Canal Bass Ave µg/L	CCID Outside Canal Bass Ave µg/L
July 2, 2002	<0.4	<0.4	<0.4	0.6	0.5	0.5	0.5
August 7, 2002	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	<0.4
September 4, 2002	<0.4	<0.4	<0.4	0.4	0.5	0.5	0.5
October 2, 2002	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
November 6, 2002	0.4	0.5	0.5	0.4	0.6	0.6	0.6
December 4, 2002	0.8	<0.4	1.0	0.7	1.0	0.7	0.9
January 8, 2003	<0.4	0.6	0.9	1.3	2.1	1.7	NA
February 5, 2003	0.4	0.5	1.0	1.2	1.3	1.4	1.4
January 7, 1900	1.1	0.8	2.0	0.7	1.5	0.9	0.9
April 2, 2003	<0.4	<0.4	0.8	1.5	1.8	1.6	1.7
May 7, 2003	<0.4	0.5	0.6	0.9	0.9	1.1	0.9
June 7, 2003	<0.4	0.9	0.6	0.9	1.3	1.0	1.3
July 2, 2003	<0.4	<0.4	<0.4	1.0	0.6	0.7	0.8
August 6, 2003	<0.4	0.6	0.4	0.6	0.6	0.6	0.6
September 3, 2003	<0.4	<0.4	<0.4	0.7	0.5	0.5	0.6
October 1, 2003	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
November 5, 2003	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
November 19, 2003	NA	<0.4	1.3	1.0	1.0	1.0	1.0
January 7, 2004	0.8	NA	NA	NA	NA	NA	NA
February 7, 2004	0.9	<0.4	<0.4	1.1	0.6	0.8	1.4
March 7, 2004	1.1	0.9	0.7	0.9	1.0	1.1	1.1
April 7, 2004	0.5	1.3	0.6	1.2	1.2	1.2	1.8
May 4, 2004	NA	0.5	0.7	0.7	0.8	0.9	0.8
June 2, 2004	<0.4	0.8	<0.4	0.7	1.0	0.7	0.7
July 7, 2004	<0.4	0.6	0.4	0.6	0.7	0.6	0.6
August 5, 2004	<0.4	<0.4	<0.4	0.5	0.8	0.9	0.8
September 8, 2004	0.6	<0.4	<0.4	0.5	0.5	0.5	0.5
October 6, 2004	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
November 3, 2004	<0.4	<0.4	<0.4	0.6	0.7	0.6	0.6
December 1, 2004	0.6	0.8	<0.4	1.4	1.3	1.0	0.9
January 5, 2005	0.4	1.0	0.4	1.8	1.4	1.1	1.2
February 2, 2005	<0.4	1.4	1.1	1.4	1.4	1.5	1.6
March 3, 2005	0.6	1.7	1.5	2.1	1.8	1.8	1.8
April 6, 2005	<0.4	1.5	1.3	2.5	1.8	<0.4	1.6
May 4, 2005	0.5	1.7	2.3	6.6	2.9	<0.4	0.5
June 2, 2005	0.5	3.8	5.7	7.6	5.5	0.5	<0.4
July 5, 2005	<0.4	0.9	0.8	0.7	1.0	0.8	0.7
August 3, 2005	0.7	<0.4	0.6	0.6	0.4	0.6	0.7
September 7, 2005	0.8	<0.4	<0.4	0.9	0.8	1.0	1.0
October 5, 2005	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
November 9, 2005	3.7	NA	NA	NA	NA	NA	NA
December 7, 2005	0.7	<0.4	<0.4	1.2	<0.4	NA	NA
January 4, 2006	<0.4	<0.4	<0.4	<0.4	0.4	NA	NA
February 1, 2006	0.5	0.5	0.7	1.1	2.6	2.7	2.8
March 1, 2006	<0.4	0.8	0.7	1.3	1.2	1.2	1.1
April 5, 2006	<0.4	3.8	4.0	5.6	5.9	0.6	2.5
May 1, 2006	<0.4	5.8	6.7	12	10.0	<0.4	<0.4
June 6, 2006	<0.4	4.5	5.8	12	11.0	0.4	<0.4
July 5, 2006	<0.4	0.5	0.5	1.3	1.1	1	1.1
August 1, 2006	<0.4	<0.4	<0.4	0.5	0.7	0.7	0.7
September 6, 2006	<0.4	<0.4	<0.4	0.4	<0.4	<0.4	<0.4
October 4, 2006	<0.4	<0.4	<0.4	<0.4	0.4	0.5	0.4
November 6, 2006	0.5	0.5	<0.4	0.6	0.5	0.5	0.6
December 6, 2006	<0.4	1.3	1.0	1.5	<0.4	<0.4	NA
January 9, 2007	0.7	0.7	0.7	0.7	0.7	1.0	0.8
February 6, 2007	<0.4	0.8	1.5	1.2	1.4	1.6	1.4
March 6, 2007	<0.4	0.9	1.2	1.3	1.5	1.4	1.4
April 4, 2007	0.5	1.1	1.0	1.1	1.3	1.4	1.4

Data Source: Selenium concentration in monthly grab samples collected by Reclamation

Notes: McCabe Road samples collected up to two days before or after listed date.

Table 7a. Summary of the monthly average selenium concentrations (flow-weighted)

Sample Site: DMC Milepost: Units:	DMC Near Headworks MP-3.50 µg/L	DMC Check 13 MP-70.01 µg/L	DMC Combined Sumps µg/L	DMC Bass Ave MP-116.48 µg/L	CCID Main Canal Bass Ave µg/L
July 2002	<0.4	<0.4	266	0.7	0.6
August 2002	<0.4	<0.4	192	0.6	<0.4
September 2002	<0.4	<0.4	185	0.6	0.5
October 2002	<0.4	<0.4	230	<0.4	<0.4
November 2002	0.5	0.4	234	0.8	0.8
December 2002	0.4	<0.4	233	1.1	1.1
January 2003	0.4	<0.4	265	1.3	1.3
February 2003	0.5	0.6	207	1.2	1.4
March 2003	1.0	1.0	225	1.8	1.8
April 2003	0.4	0.4	210	1.3	1.3
May 2003	<0.4	<0.4	261	0.9	1.0
June 2003	<0.4	<0.4	207	0.7	0.7
July 2003	<0.4	<0.4	177	0.6	0.5
August 2003	<0.4	<0.4	160	0.5	0.5
September 2003	<0.4	<0.4	152	0.5	0.5
October 2003	<0.4	<0.4	203	<0.4	<0.4
November 2003	<0.4	<0.4	198	1.0	0.6
December 2003	0.5	0.5	233	NA	NA
January 2004	0.5	0.5	197	1.0	NA
February 2004	0.7	0.7	182	1.3	1.3
March 2004	0.8	0.7	180	1.6	1.6
April 2004	0.5	0.5	214	1.2	1.1
May 2004	0.4	<0.4	210	0.7	0.7
June 2004	<0.4	<0.4	192	0.7	0.7
July 2004	<0.4	<0.4	216	0.5	0.6
August 2004	<0.4	<0.4	175	<0.4	0.4
September 2004	<0.4	<0.4	182	<0.4	<0.4
October 2004	<0.4	<0.4	163	<0.4	<0.4
November 2004	<0.4	<0.4	194	0.8	1.0
December 2004	<0.4	<0.4	212	NA	1.1
January 2005	<0.4	<0.4	224	1.3	1.5
February 2005	0.4	0.6	202	1.7	1.7
March 2005	0.9	0.9	228	2.2	2.1
April 2005	0.5	0.5	255	3.4	<0.4
May 2005	<0.4	<0.4	200	6.1	<0.4
June 2005	<0.4	<0.4	179	1.6	0.6
July 2005	<0.4	<0.4	191	0.8	0.6
August 2005	<0.4	<0.4	193	0.6	0.6
September 2005	<0.4	<0.4	181	0.5	0.5
October 2005	<0.4	<0.4	201	<0.4	0.4
November 2005	<0.4	<0.4	210	0.5	0.5
December 2005	<0.4	<0.4	208	0.7	NA
January 2006	<0.4	<0.4	184	NA	0.6
February 2006	<0.4	0.6	209	1.0	0.9
March 2006	<0.4	<0.4	201	1.6	1.2
April 2006	<0.4	<0.4	222	6.7	<0.4
May 2006	<0.4	0.4	205	8.4	<0.4
June 2006	<0.4	<0.4	216	5.1	<0.4
July 2006	<0.4	<0.4	189	0.9	<0.4
August 2006	<0.4	<0.4	186	0.0	<0.4
September 2006	<0.4	<0.4	203	0.5	<0.4
October 2006	<0.4	<0.4	251	0.5	<0.4
November 2006	<0.4	<0.4	254	0.5	<0.4
December 2006	<0.4	<0.4	239	0.9	<0.4
January 2007	0.5	<0.4	221	0.8	0.4
February 2007	0.5	0.5	264	0.9	0.4
March 2007	<0.4	<0.4	272	1.3	0.5
April 2007	0.4	0.2	290	1.3	0.8

Data Sources: Reclamation

Notes:

Table 7b. Summary of the estimated selenium loads

Sample Site: DMC Milepost: Units:	DMC Near Headworks MP-3.50 pounds/month	DMC Check 13 MP-70.01 pounds/month	DMC Combined Sumps pounds/month	DMC Bass Ave MP-116.48 pounds/month	CCID Main Canal Bass Ave pounds/month
July 2002	163	136	73	276	100
August 2002	145	88	68	182	49
September 2002	138	57	66	128	29
October 2002	135	63	52	82	44
November 2002	258	38	44	67	34
December 2002	226	22	41	53	41
January 2003	291	28	49	64	20
February 2003	348	186	46	220	114
March 2003	721	217	46	271	100
April 2003	150	71	56	180	55
May 2003	100	76	70	198	94
June 2003	157	121	60	289	116
July 2003	140	118	59	283	103
August 2003	151	99	96	171	88
September 2003	143	71	66	140	60
October 2003	146	51	41	59	30
November 2003	185	29	51	62	15
December 2003	349	26	50	0	0
January 2004	336	52	50	63	0
February 2004	442	162	99	246	86
March 2004	554	153	69	296	116
April 2004	148	99	67	204	76
May 2004	57	129	70	186	88
June 2004	135	125	57	279	106
July 2004	146	112	80	218	99
August 2004	148	87	82	126	51
September 2004	149	51	49	47	15
October 2004	157	47	39	58	27
November 2004	222	27	87	74	33
December 2004	134	20	71	NA	6
January 2005	117	19	76	36	28
February 2005	241	93	81	217	77
March 2005	495	121	90	262	73
April 2005	159	27	106	126	14
May 2005	61	15	94	83	28
June 2005	176	52	66	299	90
July 2005	185	101	89	324	121
August 2005	156	97	83	231	104
September 2005	151	71	53	120	51
October 2005	145	55	56	72	35
November 2005	187	44	48	66	22
December 2005	184	17	27	10	0
January 2006	194	15	35	NA	4
February 2006	177	86	46	130	89
March 2006	143	17	60	125	40
April 2006	26	2	55	54	3
May 2006	68	10	64	70	26
June 2006	114	19	59	92	45
July 2006	158	334	54	104	107
August 2006	217	95	56	266	66
September 2006	141	68	53	134	26
October 2006	156	46	46	93	23
November 2006	180	33	29	60	10
December 2006	194	21	25	79	11
January 2007	339	49	26	105	25
February 2007	362	127	77	209	45
March 2007	233	56	92	186	28
April 2007	187	42		194	61

Data Sources: Loads calculated by Reclamation

Notes:

Table 8a. Summary of the Total Dissolved Solids

Sample Site: DMC Milepost: Units:	DMC Near Headworks MP-3.50 mg/L	DMC Check 13 MP-70.01 mg/L	DMC Combined Sumps uS/cm	DMC Bass Ave MP-116.48 mg/L	CCID Main Canal Bass Ave mg/L
July 2002	193	177		194	191
August 2002	277	271		288	273
September 2002	341	336	5,078	343	347
October 2002	346	348	5,061	357	367
November 2002	329	326	5,056	336	335
December 2002	362	352	4,816	373	374
January 2003	332	325	5,170	364	364
February 2003	312	316	4,355	340	361
March 2003	347	363	4,421	359	362
April 2003	260	278	4,633	303	290
May 2003	257	253	5,024	272	270
June 2003	168	172	4,605	185	190
July 2003	141	141	4,227	156	154
August 2003	170	168	4,061	181	181
September 2003	215	208	4,004	216	217
October 2003	305	300	4,611	312	308
November 2003	315	308	4,421	314	301
December 2003	363	351	4,835	322	NA
January 2004	324	318	4,780	330	291
February 2004	323	324	4,445	337	348
March 2004	327	306	4,469	346	347
April 2004	262	252	4,831	281	279
May 2004	286	276	4,786	279	281
June 2004	236	247	4,444	250	263
July 2004	204	207	4,363	222	215
August 2004	209	205	4,224	211	211
September 2004	266	265	4,129	279	278
October 2004	301	300	4,386	307	306
November 2004	291	282	4,459	298	301
December 2004	350	344	4,760	367	307
January 2005	293	304	4,539	291	348
February 2005	213	320	4,690	352	356
March 2005	311	314	5,080	360	356
April 2005	164	199	5,118	300	58
May 2005	155	164	4,588	361	56
June 2005	143	152	4,328	179	91
July 2005	204	162	4,447	188	163
August 2005	204	202	4,274	206	210
September 2005	247	240	4,312	254	248
October 2005	228	220	4,646	224	223
November 2005	306	293	4,579	287	285
December 2005	331	336	4,940	354	NA
January 2006	158	159	4,282	297	69
February 2006	207	212	4,473	213	211
March 2006	164	152	4,341	221	168
April 2006	131	149	4,744	326	65
May 2006	94	105	4,616	376	51
June 2006	107	108	4,729	299	50
July 2006	186	164	4,374	279	152
August 2006	184	187	4,205	196	198
September 2006	188	186	4,631	198	199
October 2006	182	175	5,070	191	187
November 2006	258	238	5,100	219	209
December 2006	300	303	5,103	307	311
January 2007	284	321	4,711	334	337
February 2007	312	316	4,896	331	329
March 2007	282	281	5,141	310	272
April 2007	264	253	5,307	284	288

Data Sources:

Total Dissolved Solids calculated by Reclamation

Notes:

Conversion factors for Electrical Conductivity to Total Dissolved Solids:

0.5325 EC + 21.4

0.5317 EC + 21.0

0.65 EC

0.5252 EC + 24.87

0.5296 EC + 21.67

Table 8b. Summary of the estimated salt loads

Sample Site: DMC Milepost: Units:	DMC Near Headworks MP-3.50 tons/month	DMC Check 13 MP-70.01 tons/month	DMC Combined Sumps tons/month	DMC Bass Ave MP-116.48 tons/month	CCID Main Canal Bass Ave tons/month
July 2002	70,205	49,767		41,657	16,217
August 2002	100,357	58,735		46,313	18,360
September 2002	117,903	46,043	864	36,309	14,887
October 2002	118,467	44,851	571	40,848	22,041
November 2002	96,032	16,227	470	15,235	7,649
December 2002	99,995	11,690	378	9,972	6,876
January 2003	118,103	12,491	453	9,228	2,676
February 2003	100,913	41,927	493	34,373	16,314
March 2003	123,190	11,326	513	28,658	11,348
April 2003	41,281	21,429	620	20,254	6,173
May 2003	31,545	38,293	660	31,389	12,968
June 2003	59,788	42,433	676	36,993	15,494
July 2003	49,064	41,583	704	35,690	15,535
August 2003	60,986	40,919	1,206	34,917	16,896
September 2003	74,255	34,844	869	29,390	15,158
October 2003	109,477	36,090	359	33,756	14,612
November 2003	110,214	14,518	536	10,558	4,614
December 2003	125,596	8,674	513	0	0
January 2004	117,708	17,158	603	9,968	589
February 2004	99,936	37,194	1,198	32,756	11,483
March 2004	113,013	34,110	850	32,016	12,661
April 2004	41,492	27,083	763	24,271	9,574
May 2004	22,978	51,205	798	39,555	18,772
June 2004	69,128	60,633	832	47,098	19,719
July 2004	74,355	57,780	804	47,878	19,394
August 2004	77,223	43,554	941	35,057	14,502
September 2004	95,052	33,853	604	30,080	10,890
October 2004	109,353	34,770	532	30,008	15,767
November 2004	100,950	14,026	967	14,025	4,794
December 2004	110,955	11,934	771	0	827
January 2005	71,360	8,523	763	7,055	3,300
February 2005	62,619	23,129	933	22,907	8,104
March 2005	87,861	22,122	1,002	21,389	6,129
April 2005	28,110	5,730	1,053	5,510	1,530
May 2005	13,790	3,960	1,091	2,480	2,490
June 2005	48,630	19,850	800	17,030	6,780
July 2005	74,600	40,860	1,024	37,190	15,590
August 2005	75,060	49,100	899	39,670	18,190
September 2005	85,090	36,610	629	31,730	12,440
October 2005	82,750	29,450	662	26,480	10,590
November 2005	105,760	22,910	504	18,520	6,120
December 2005	118,120	8,580	311	2,490	0
January 2006	51,630	3,440	406	4,800	220
February 2006	60,690	15,230	485	14,010	10,320
March 2006	49,130	6,250	651	8,470	2,940
April 2006	8,650	900	609	1,320	360
May 2006	14,180	1,410	701	1,570	3,020
June 2006	28,930	5,180	645	2,670	3,990
July 2006	68,560	32,700	629	40,440	17,890
August 2006	67,570	44,440	632	42,220	19,590
September 2006	66,660	29,820	600	25,480	11,920
October 2006	65,260	19,930	471	19,640	10,890
November 2006	84,020	13,400	294	14,340	5,390
December 2006	103,670	14,950	252	13,900	7,220
January 2007	103,360	25,010	279	22,870	10,000
February 2007	102,690	42,330	766	38,500	14,600
March 2007	94,880	27,790	837	22,730	7,080
April 2007	58,240	23,580	802	21,380	11,230

Data Sources:

Loads calculated by Reclamation

Notes:

Conversion factors for Electrical Conductivity to Total Dissolved Solids:

0.5325 EC + 21.4

0.5317 EC + 21.0

0.65 EC

0.5252 EC + 24.87

0.5296 EC + 21.67

Table 9. Concentration of Mercury in the Delta-Mendota Canal and Sumps, grab samples

Sample Site: DMC Milepost: Units:	DMC McCabe Rd MP-68.03 ng/L	DMC Telles Ranch MP-100.850 ng/L	Sump A & B MP 100.86 ng/L	Sump C MP 102.86 ng/L	Sump D & E MP 104.19 ng/L	Sump F & G MP 105.60 ng/L	Sump H & J MP 107.24 ng/L	Sump K MP 109.50 ng/L	DMC Washoe Ave MP-110.120 ng/L
July 2, 2002	<5	<5							<5
August 7, 2002	<5								6.9
September 4, 2002	1.8	3.4							5.4
October 2, 2002	1.1	1.5	900	300	300	1,100	1,200	700	1.1
November 6, 2002	<50	<8							<8
December 4, 2002	1.1	1.4							3.7
January 8, 2003	4.6	5.5							7.0
February 5, 2003	3.2	3.7							7.2
March 5, 2003	2.2	5.5							5.9
April 2, 2003	2.5	3.4	500	400	300	300	900	500	6.6
May 7, 2003	3.7	4.0							5.7
June 4, 2003	2.1	6.2							9.5
July 2, 2003	1.5	3.3							4.3
August 6, 2003	1.1	4.1							4.1
September 3, 2003	2.3	4.7							4.5
October 1, 2003	1.9	6.8	200	200	300	900	900	1,900	8.1
November 5, 2003	0.71	2.6							5.1
November 19, 2003		2.1							4.8
December 3, 2003	4.3								
January 7, 2004	1.6								
February 5, 2004	1.5								
March 4, 2004	3.4								
April 7, 2004	1.6	6.7	400	300	500	800	1,100	1,700	14.0
May 4, 2004		2.1							3.5
June 2, 2004	<2.0	15.0							13.0
July 7, 2004	<2.0								
August 4, 2004	2.2	11.0							7.9
September 7, 2004	<2.0								
September 27, 2004									
October 6, 2004	<2.0	12.0	400	300	300	900	1,000	2,100	6.2
November 3, 2004	<2.0	2.3							4.5
December 1, 2004	<2.0	<2.0							4.2
January 5, 2005	3.3	3.1							7.3
February 2, 2005	2.6	4.6							8.4
March 2, 2005	<2.0	5.3							6.4
April 6, 2005	2.4	10.0	400	200	300	900	1,000	1,800	7.7
May 4, 2005	<2.0	3.4							4.3
June 2, 2005	2.1								
July 5, 2005	<2.0								
July 13, 2005									
August 3, 2005	<2.0								
September 7, 2005	<2.0	<2.0							3.0
October 5, 2005	<2.0	6.7	800	300	200	1,200	1,000	3,000	8.9
November 9, 2005	3.4								
December 7, 2005	3.0	<2.0							
January 4, 2006	3.9	2.8							11.0
February 1, 2006	2.0	6.0							8.0
March 1, 2006	<2.0	6.8							4.2
April 5, 2006	<2.0	3.9	360	340	270	1,200	900	1,800	8.5
May 1, 2006	<2.0	5.5							5.4
June 6, 2006	<2.0	5.2							3.9
July 4, 2006	7.1	7.0							12.0
August 1, 2006	<2.0	4.2							7.3
September 6, 2006	<2.0	2.3							3.3
October 4, 2006	<2.0	2.6	1,400	370	580	1,000	940	1,200	3.2
November 6, 2006	<2.0	<2.0							2.9
December 6, 2006	<2.0	<2.0							4.2
January 9, 2007	<2.0	5.3							6.4
February 6, 2007	3.8								
March 6, 2007	2.9	5.8							6.5
April 4, 2007	2.2		260	220	340	710	670	1,100	6.2

Data Source: Concentration of mercury in monthly grab samples collected by Reclamation

Notes: McCabe Road samples collected up to two days before or after listed date.

Table 10. Concentration of Boron in the Delta-Mendota Canal and Sumps, grab samples

Sample Site: DMC Milepost: Units:	DMC McCabe Rd MP-68.03 µg/L	DMC Telles Ranch MP-100.850 µg/L	Sump A & B MP 100.86 µg/L	Sump C MP 102.86 µg/L	Sump D & E MP 104.19 µg/L	Sump F & G MP 105.60 µg/L	Sump H & J MP 107.24 µg/L	Sump K MP 109.50 µg/L	DMC Washoe Ave MP-110.120 µg/L
July 2, 2002	130	150							170
August 7, 2002	90								130
September 4, 2002	130	130							160
October 2, 2002	140	160	18,000	12,000	10,000	13,000	12,000	11,000	150
November 7, 2002	160								
December 4, 2002	500	170							180
January 8, 2003	140	430							330
February 5, 2003	460	520							340
March 5, 2003	340	750							180
April 2, 2003	120	240	12,000	17,000	10,000	13,000	14,000	14,000	260
May 7, 2003	270	240							250
June 4, 2003	110	140							160
July 2, 2003	72	240							160
August 6, 2003	75	150							170
September 4, 2003	80								
October 1, 2003	140	<250	24,000	16,000	11,000	11,000	13,000	19,000	130
November 5, 2003	160	170							160
November 19, 2003		430							290
December 3, 2003	110								
January 7, 2004	530								
February 4, 2004	660	130							230
March 3, 2004	410	200							140
April 7, 2004	120	130	13,000	16,000	9,000	11,000	12,000	17,000	300
May 4, 2004		180							200
June 2, 2004	220	220							270
July 6, 2004	96	150							160
August 4, 2004	110	81							100
September 7, 2004	260	110							200
October 6, 2004	140	170		15,000	11,000	13,000	13,000	21,000	130
November 3, 2004	170	190							200
December 1, 2004	360	140							480
January 5, 2005	290	260							450
February 2, 2005	170	370							190
March 2, 2005	240	320							430
April 6, 2005	190	280	25,000	16,000	12,000	15,000	12,000	25,000	310
May 4, 2005	160	280							510
June 1, 2005	78	450							660
July 5, 2005	110	200							120
August 3, 2005	170	270							150
September 7, 2005	300	130							210
October 5, 2005	120	97	23,000	16,000	10,000	14,000	12,000	23,000	120
November 9, 2005	110								
December 7, 2005	370	240							240
January 4, 2006	92	200							330
February 1, 2006	190	150							180
March 1, 2006	150	180							280
April 5, 2006	130	310	15,000	20,000	10,000	14,000	13,000	16,000	460
May 1, 2006	62	390							700
June 6, 2006	59	370							730
July 4, 2006	100	100							130
August 1, 2006	83	98							100
September 6, 2006	110	87							220
October 4, 2006	160	74	24,000	20,000	11,000	13,000	13,000	16,000	100
November 6, 2006	190	100							110
December 6, 2006	92	230							260
January 9, 2007	250	300							230
February 6, 2007	150								
March 6, 2007	280	260							280
April 4, 2007	250	360	12,000	15,000	9,300	11,000	10,000	13,000	270

Data Source:

Boron concentration in monthly grab samples collected by Reclamation

Notes:

McCabe Road samples collected up to two days before or after listed date.

Table 11. Sampling locations, frequency, parameters, methods, calculations

DMC Milepost	Sample Location	Sample Frequency	Flow Measurements		Water Quality Parameters	
			Data Source	Method	Data Source	Method
3.50	DMC Headworks near Tracy (Table 1)	Daily	SLDMWA	Flow meter	Reclamation	1/
70.01	DMC Check 13 at O'Neill Forebay (Table 2)	Daily	SLDMWA	Height of the radial gate	Reclamation	1/
111.22	Firebaugh Wasteway (Table 3)	Daily	SLDMWA	Height of the radial gate		
116.48	DMC Check 21 at Bass Ave (Table 3)	Daily	SLDMWA	Height of the radial gate	Reclamation	1/
	CCID Main Canal at Bass Ave (Table 4)	Daily	SJRECWA	Height of the radial gate	Reclamation	1/
	Drain Sumps near Firebaugh (Table 5)					
100.86	Sumps A & B	Weekly	Reclamation	2/	Reclamation	3/
102.86	Sump C	Weekly	Reclamation	2/	Reclamation	3/
104.19	Sumps D & E	Weekly	Reclamation	2/	Reclamation	3/
105.60	Sumps F & G	Weekly	Reclamation	2/	Reclamation	3/
107.24	Sumps H & J	Weekly	Reclamation	2/	Reclamation	3/
109.50	Sump K	Weekly	Reclamation	2/	Reclamation	3/
	DMC and CCID Canals (Table 6)					
69.03	DMC, McCabe Rd., MP-68.03	Monthly		Not Collected	Reclamation	4/
97.68	DMC, Russell Ave, MP-97.68	Monthly		Not Collected	Reclamation	4/
100.85	DMC, Telles Ranch MP-100.85	Monthly		Not Collected	Reclamation	4/
110.12	DMC, Washoe Ave, MP-110.12	Monthly		Not Collected	Reclamation	4/
116.48	DMC, Bass Ave, MP-116.48	Monthly		Not Collected	Reclamation	4/
	CCID Main Canal, Bass Ave	Monthly		Not Collected	Reclamation	4/
	CCID Outside Canal, Bass Ave	Monthly		Not Collected	Reclamation	4/

Notes:

- 1/ Composite daily samples are collected with autosamplers for specific conductance, boron, and selenium
 2/ Conversion of electricity used by each sump pump
 3/ Weekly grab samples are collected from each sump
 4/ Depth-width integrated samples are collected at each site

Abbreviations:

µg/L	micrograms per liter (parts per billion)
µS/cm	micro Siemens per centimeter
CCID	Central California Irrigation District
cfs	cubic feet per second
DMC	Delta-Mendota Canal
mg/L	milligrams per liter (parts per million)
NA	sample not collected, results not available
ng/L	nanograms per liter (parts per trillion)
P	sample collected, results pending
Reclamation	U. S. Bureau of Reclamation, Mid-Pacific Region, Environmental Monitoring Branch, Sacramento, California
SJRECWA	San Joaquin River Exchange Contractors Water Authority, Los Banos, California
SLDMWA	San Luis & Delta-Mendota Water Authority, Tracy, California

Calculations:

Flow-weighted selenium concentration (µg/L) =

$$\frac{\text{Sum of (daily flow * se concentration of daily sample)}}{\text{sum of daily flows when samples collected}}$$

 Selenium load (pounds) =

$$\text{Total flow (acre-feet) * flow-weighted selenium concentration (µg/L) * 0.00272}$$

 Flow-weighted specific conductance (µS/cm) =

$$\frac{\text{Sum of (daily flow * specific conductance of daily sample)}}{\text{Sum of daily flows when samples collected}}$$

 Salt load (tons) =

$$\text{Total Flow (acre-feet) * total dissolved solids (mg/L) * 0.00136}$$

Data compiled by M.C. S. Eacock, U.S. Bureau of Reclamation, South-Central California Area Office, Fresno, California

12-Jun-07

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Attachment 2
Pumping Test Results,
Central California Irrigation Firebaugh Canal Water Districts
by
HydroFocus
2003

PUMPING TEST RESULTS, CENTRAL CALIFORNIA IRRIGATION FIREBAUGH CANAL WATER DISTRICTS

Introduction and Background

In the western San Joaquin Valley, agriculture requires drainage to maintain the soil salt balance and prevent water logging in the root zone. Drainage water is high in total dissolved solids, selenium and other trace constituent concentrations, and water quality objectives limit discharge to the San Joaquin River. Hence, there is a need to minimize drainage water production and constituent loads.

The western San Joaquin Valley groundwater system consists of a semiconfined zone of Coast Range and Sierran alluvium which overlies a confined zone (Figure 1). The Coast Range alluvium is more than 800 feet thick along the Coast Ranges and thins to a few feet near the valley axis (Miller and others, 1971). The Sierran sand is 400 to 500 feet thick in the valley trough and thins eastward and westward (Miller and others, 1971). The confined zone ranges in thickness from 570 to 2,460 feet (Williamson and others, 1989).

Under natural conditions, recharge was primarily from infiltration of water from intermittent streams (Little Panoche, Panoche, and Cantua creeks) and possibly the smaller ephemeral streams. Presently, most of the land is developed for agricultural production and deep percolation of irrigation water is the primary source of recharge. Prior to the 1950's and 1960's, much of the area relied on groundwater as the sole source of irrigation water. Since 1960's, most of the Grasslands Drainage Area and Westlands Water District has relied primarily on imported surface water for irrigation, with groundwater providing an important secondary source.

Leaching is necessary for irrigated agriculture; irrigation water in addition to crop water requirements removes salts from the root zone. In the western San Joaquin Valley, percolating irrigation water unavoidably contributes to rising groundwater levels. The groundwater levels rise because there is a water budget imbalance; more water enters the groundwater from natural and irrigation recharge than leaves through pumping, drainage, and subsurface outflow. In the upslope, undrained areas, rising groundwater levels increase hydraulic gradients to the drainage systems, which increase drainage volumes.

The U.S. Geological Survey, San Joaquin Valley Drainage Program (1990) and San Joaquin Valley Drainage Implementation Program concluded that increased groundwater pumping would reduce San Joaquin Valley drainage water volumes. Using a groundwater-flow model, Belitz and Phillips (1992) concluded that increased pumping and reduced deep percolation could reduce drainage volumes over large areas.

Pump test results and historic hydrologic data support the modeling results. For example, Ken Schmit and Associates (1989) conducted a 14-day pump test using a large-capacity well near Mendota. Observation wells screened in shallow fine-grained materials showed 0.4- to 0.7-foot declines during pumping. During a 30-day pump test in Central California Irrigation District (CCID), shallow groundwater levels and drain flows decreased. Belitz and Heimes (1990) reported water table declines as the result of pumping during the first half of the 20th century prior to delivery of imported surface water to the western San Joaquin Valley. Drain flows are directly proportional shallow water levels. For development of a comprehensive pumping strategy for drain flow reduction, additional field testing is needed to better understand the effects of pumping on drain flows and shallow water levels. Additional analyses are required to define the potential beneficial use of the pumped water.

Water quality is the primary factor limiting beneficial use of the pumped groundwater; total dissolved solids and selenium are the limiting constituents. Based on data collected for production and monitoring wells, selenium concentrations range from less than .0001 to 0.012 mg/L in the lower portion of the semiconfined aquifer. In samples collected from most wells in the lower semiconfined (below 400 feet) and in the confined aquifer, concentrations were less than 0.001 mg/L. Selenium in groundwater samples in the Sierra sands is consistently less than 0.001 mg/L. Duybrovsky and others (1990) demonstrated selenium reduction to elemental selenium in Sierran deposits near Mendota.

Data presented in Dubrovsky and others (1993) indicates that total dissolved solids concentrations are typically less than 2,000 mg/L in the Coast Range sediments and less than 3,000 mg/L in the Sierran sediments. Quinn and others (1990) stated that groundwater with dissolved solids concentrations less 1,250 mg/L underlie more than 20 % of the Grasslands Drainage Area with an aquifer thickness of 100 to 200 feet.

During the summer of 2002, we conducted a study to evaluate the potential for reducing shallow-zone water levels and drainage volumes in Firebaugh Canal Water District and Central California Irrigation District by pumping groundwater from the Sierran sands. The primary objective of the study was to assess the water quality and hydraulic effects of pumping in the Grasslands Drainage Area. This study is the first phase of a long-term effort to answer questions about the feasibility of pumping for water supply and drainage reduction in the Grasslands Drainage Area. These questions include the following.

- What will be the probable effect on drainage volumes and shallow water levels as the result of pumping?
- What is the expected quality of the pumped groundwater?
- How will the groundwater be used?

- How much water can be pumped?

We developed and completed a study to preliminarily address the first three questions. We pumped water into CCID's Outside Canal from two wells in CCID for 45 to 60 days and measured changes in water levels in shallow monitoring wells, drain flow and quality, quality of the pumped water and canal-water quality. We also developed a groundwater flow model to evaluate the results.

Methods

HydroFocus, FCWD and CCID personnel jointly conducted monitoring and data analysis during and after the pump test. The Del Rey and Snyder wells shown in Figure 2 began pumping water into the CCID Outside Canal on August 1, 2002. The wells stopped pumping on September 19 (Snyder) and September 30 (Del Rey). The total volume pumped was about 1,000 acre feet. Prior to pumping, we selected existing monitoring wells and drainage systems for monitoring within about a 1-mile radius of the pumped wells (Figure 2). Also, we installed additional monitoring wells. The monitoring wells were designed to intercept the water table and were completed within 20 feet of land surface. Wells were constructed as shown in Figure 3.

We received notice to proceed on the project in early July, 2002 and started collecting data on July 19, 2002. Initially, we attempted to establish baseline conditions by measuring daily monitoring- well water levels and drain flows before initiating the pumping test. All the drainage sumps have working flow meters on the discharge pipes. We measured electrical conductivity (EC) of the drainage water when we measured flow. We collected samples from drainage sumps for determination of selenium concentrations. Irrigation events and any other water-related activities were recorded at the time of drain-flow and water-level measurements. After pumping began, we measured daily or twice daily

water levels in monitoring wells and flow and EC in drainage sumps. In pumping wells, water levels and EC were measured several times a day for the first few days of pumping and once or twice a day afterwards. We collected and analyzed samples for selenium from the sumps periodically during the study. The pumped volumes from the Snyder and Del Rey wells were monitored hourly to daily throughout the study. After pumping stopped, we continued to measure water levels for about 30 days in the monitoring wells. We followed USGS procedures for measuring water levels using graduated steel tapes or electric sounders.

We collected field water quality data and collected periodic samples from the Outside Canal and the water pumped from Snyder and Del Rey wells. We used USGS procedures for instrument calibration for EC and pH measurement. This included frequent and daily meter calibration and checking with EC standards with values within 15 % the EC of the sample and pH calibration with 2 buffers that bracket the sample pH. Table 1 shows the constituents and analysis methods for the groundwater and canal samples. Weck Laboratories in City of Industry, California performed all laboratory analyses.

Table 1. List of constituents and methods of analysis for samples collected in drain sumps, Outside Canal and Del Rey and Snyder wells. Only selenium concentrations were determined on drain sump samples.

Analyte	Method of Analysis
Selenium	Inductively coupled plasma/mass spectrophotometry with hydride generation (EPA method 200.8)
Molybdenum, arsenic, calcium, magnesium, sodium, potassium, boron	Inductively coupled plasma and mass spectrophotometry (EPA methods 200.7 and 200.8)
Chloride, sulfate	Ion chromatography (EPA method 300)

Alkalinity	Acid titration (EPA method 2320B)
Dissolved Solids	Residue upon evaporation

Data analysis

We quantified the temporal and spatial changes in water levels and drain flows and loads as the result of pumping and compared data for drain flow with historical data. We utilized a groundwater flow model to analyze the pumping test data. We used the Belitz and others (1993) model and other data to specify boundary conditions for a groundwater flow model that encompassed the study area (Figure 4). We developed a 3-layer model that extends to the Corcoran Clay. The top two layers were 20 and 30 feet respectively. The top of the Corcoran Clay was specified as a no-flow boundary. We used the Belitz model to specify a flux at the western boundary. Based on groundwater level data from Department of Water Resources maps for the semi-confined zone, we specified a general head boundary at the eastern boundary. We varied model recharge from 0.0 to 0.7 ft/year based on HydroFocus (1999). We specified evaporation of the shallow water table from the Belitz model. We used initial hydraulic conductivity and storage values from the Belitz model. We spatially averaged conductivity and storage values from Belitz and others (1993) for the third model layer. Drain conductance values came from Fio and Deverel (1991).

Results

Water levels and pumping

Figure 5 shows water level changes and pumped volumes in the Snyder and Del Rey wells. Figure 5 shows immediate drawdowns of 120 and 30 feet in the Snyder and Del Rey wells, respectively. The Del Rey pumping rate was relatively constant at about 12 acre-feet per day. Due to water level drawdown to

below the pumping level, the Snyder well pumped erratically during the first 3 weeks. After lowering the pump intake, the pumping volume was more constant at 9 to 12 acre-feet per day. Upon completion of the test, well water levels returned to their original level.

Example hydrographs for wells near the Del Rey and Snyder wells (Figures 6 and 7) show varying effects of pumping. The hydrographs consistently showed large increases in water levels during irrigation and downward water-level trends throughout the study. The hydrographs showed varying water-level increases after pumping ended on September 19 (Snyder well) or September 30 (Del Rey well). We estimated the amount of drawdown based on the water-level differences before and after pumping cessation. Figure 8 shows the distribution of water-level drawdowns in the monitoring wells.

Drawdowns near the Snyder well varied from 0.58 feet within a few hundred feet of the well to 0.09 foot at about 2,000 feet from the well. Near the Del Rey well, water level declines ranged from 0.3 foot in within a few hundred feet of the well to 0.05 and 0.11 foot at about 2,000 feet from the well.

Water Quality

Appendix 1 shows the results of sample analyses results for the Outside Canal and the Del Rey and Snyder wells. The primary constituents of concern are selenium, boron, molybdenum and dissolved solids, selenium being of primary concern. Selenium in all well samples was less than 0.0004 mg/L and averaged 0.00063 mg/L in the canal samples, less than the aquatic life objective of 0.002 mg/L for the San Joaquin River. Molybdenum and boron in well and canal samples were low relative to aquatic life and irrigation-water standards. Dissolved solids concentrations in well samples are high for irrigation of most salt sensitive crops but could be used to irrigate more salt tolerant species.

Drainwater salinity and selenium concentrations were generally temporally constant but spatially variable. Figure 9 shows the typical EC temporal variability during the study for the drainage sumps. Sumps CPT1 and 3 and T-9 are most likely affected by pumping. Table 2 shows the average selenium and electrical conductivity values and ranges for all the drainage sumps.

Table 2. Drainage sump selenium and electrical conductivity averages and ranges.

Drainage Sump	Average Selenium Concentration (mg/L)	Average Electrical Conductivity (S/cm)
CPT1	0.014 +/- 0.002	3222 +/- 783
CPT2	0.02 +/- .005	3898 +/- 1457
CPT3	0.037 +/- 0.011	7545 +/- 474
T4	0.215 +/- 0.025	9497 +/- 2186
T6	0.233 +/- 0.028	10674 +/- 2314
T7	0.0163 +/- 0.004	2226 +/- 639
T1C	0.0145 +/- 0.0035	3912 +/- 1696
T5	0.062 +/- 0.01075	6058 +/- 666
T9	0.039 +/- 0.005	4530 +/- 776

Drain flows

Figure 10 shows drain flow for sumps CPT1 and CPT3 and T-9. The water level data indicates pumping-induced water level drawdown in wells near drainage laterals for these sumps. We superimposed a 3-pt moving average of the form $x(t) = 1/3*(x(t+1) + x(t) + x(t-1))$ to better illustrate data trends. In all three cases there is a downward trend in the data and there appears to be an effect of

stopping pumping indicated by an upward trend after pumping stopped. However, this effect is generally consistent with observed trends in other drainage sumps monitored during the study.

Any reduction in drainflow was difficult to quantify using our data or by comparing with data from previous years. Figure 11 shows sump flow data collected during this study and during previous years monitoring. Figure 11 shows the drainflows for CPT1 are generally consistent for 2000, 2001 and 2002. Figure 11 also shows that our 2002 sump flows for CPT3 were less than 1999 flows but greater than 2001 flows. Table 3 shows that our T9 sump flows were generally consistent with or greater than 1999, 2001 and 2000 flows. Yearly variations are probably the result of cropping and irrigation differences. For the volume of water pumped during the study, small reductions in drainflow are consistent with model results.

Table 3. Drainflow (acre feet) for 2002 and previous years.

	<u>1999</u>	<u>2002</u>
28-Jul to 25-Aug	15.5	40.1
25-Aug to 29 Sep	12.8	12.5
	<u>2000</u>	<u>2002</u>
26-Jul to 30-Aug	18.2	46.9
30-Aug to 27-Sep	6.1	9.8
	<u>2001</u>	<u>2002</u>
25-Jul to	27.5	46.2

29-Aug		
25-Jul to 26-Sep	5.4	10.2

Groundwater Flow Model Results

We developed a groundwater flow model based on the Belitz and others (1993) model to compare our quantitative understanding of the groundwater system with the results of the pumping test. We used the model to perform transient simulations to estimate water-level and drain flow changes during the study. Our model parameters were from the Belitz model except we decreased the specific yield from 0.35 to 0.1 during calibration and sensitivity analysis. The model is highly sensitive to changes in this parameter. The 0.35 value is consistent with yearly time steps used for the Belitz and others (1993) simulations whereas a smaller specific yield probably reflects short term water level changes during the irrigation season. Groundwater recharge is uncertain during the irrigation season. Due to use of groundwater by plants, there may be little or no groundwater recharge. The value from HydroFocus (1999) of 0.7 foot was for yearly water budget analyses that reflected preirrigation and downward movement of groundwater across the Corcoran Clay.. Figure 12 shows the comparison of measured and calculated hydraulic heads for 0.35 and 100 simulation days. There is generally good agreement; the model predicts heads within 3 feet or 15 % of the range of measured values.

We varied the recharge between 0 and 0.7 foot and compared water levels with measured values and for simulations with and without pumping. Figure 13 shows simulation results for monitoring wells near the Del Rey and Snyder wells. Water level changes for wells DR1 and DR2 near the Del Rey well generally agree with simulated results for zero recharge. The difference between pumping and non-pumping simulation is 0.2 to 0.3 foot, generally consistent with

measured water level effects described above. There is less agreement with the water level changes at the Snyder well. There may be different lithology at the Snyder well causing greater than predicted drawdowns. However, the water-level differences between pumping and non-pumping simulations is similar to the estimated effect of pumping from the hydrographs described above.

We also used the model to estimate changes in the drainflow due to pumping. After 100 days of simulation, the model estimated a 5 percent drainflow decrease for the entire study area due to pumping. For the measured sumps, this corresponds to about 15 acre feet at the end of the study period or 0.15 acre feet per day decrease in drainflow for 9 sumps. This small decrease in drainflow is difficult to measure. These model results which are consistent with data collected during the study period also generally agree with Belitz and Phillips (1992) results. They predicted about 8.7 acre feet of drainflow reduction per 1,000 acre feet of pumping. Our model results suggest about 4.5 acre feet of drainage reduction per 1,000 acre feet of pumping for the entire model area. Differences between the estimates are probably due to the shorter pumping duration relative to the yearly analysis of Belitz and Phillips (1992).

Summary, Conclusions and Future Directions

The results of hydrologic collection during 45 to 60 days of pumping of two production wells in Central California Irrigation District demonstrated hydraulic effects on shallow groundwater levels. The results of water-quality data collection indicate the potential uses of the pumped and blended waters. Our key conclusions follow.

- Within 2,000 feet of the wells, measured shallow groundwater response ranged from 0.1 to 0.52 foot during pumping.

- Drainflow decreases as the result of pumping were difficult to quantify. This is primarily due to limited pumping duration and small pumped volume.
- Pumped water had less than 0.004 mg/L selenium. Salinity was moderately high but of acceptable quality for blending and irrigation of salt tolerant crops. Boron and molybdenum concentrations were less than concentrations that could cause harmful effects to aquatic life or plants.
- Concentrations of all measured constituents in Outside Canal water (where pumped water was discharged) were below levels of concern.
- Groundwater flow model results generally agreed with the measured data for water-level declines.
- The groundwater flow model estimated about 5 % decrease in drainflow for the entire model area. This drain volume decrease was difficult to quantify during this study.
- Groundwater flow model results are generally consistent with previous USGS analysis and estimates for drainflow reduction.

Recommended Future Directions

The results of this study demonstrate the shallow-groundwater hydraulic effects of pumping from production wells and the feasibility of using the pumped water for beneficial uses such as wildlife refuges. While model results are consistent with field results, measurable drainflow reductions will require larger scale pumping for longer durations. The variable salinity and absence of detectable selenium in the pumped water indicate a need for further investigation of the distribution of water quality and the capacity of Sierran sediments to reduce selenium. We suggest the following future directions.

- Carefully plan and implement larger scale pumping project with longer duration and larger volume. Measure change in drain flows and loads.

- Where possible, collect additional water-quality data from production wells to determine the spatial variability for constituents of concern.
- Estimate the selenium-reducing capacity of Sierran sediments using existing data and in laboratory experiments.
- Refine the groundwater flow model to reflect lithology and flow across the Corcoran Clay.
- Explore options for use of large volumes of pumped water.

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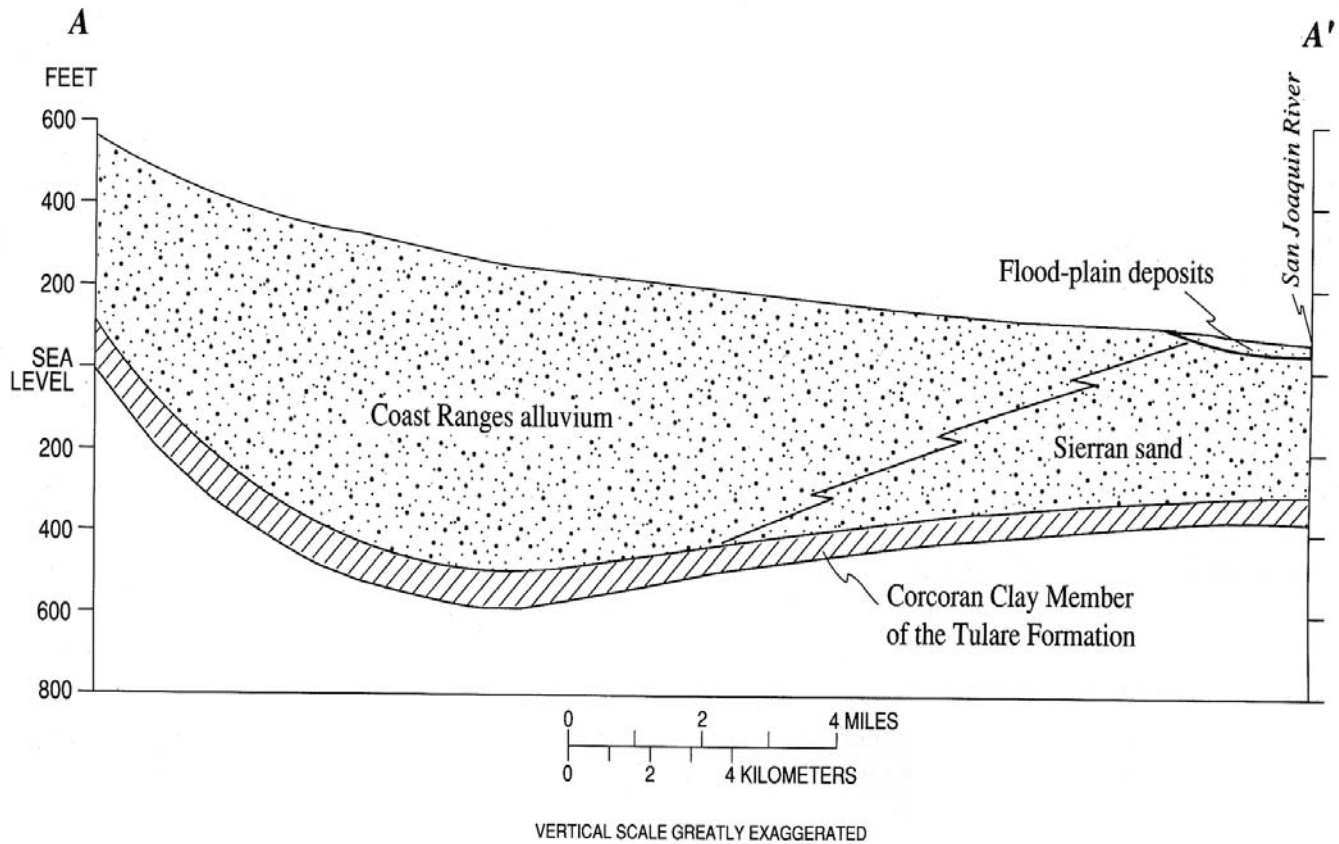
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Figure 1. Cross section showing the deposits underlying the western San Joaquin Valley (adapted from Belitz and Heimes, 1990).

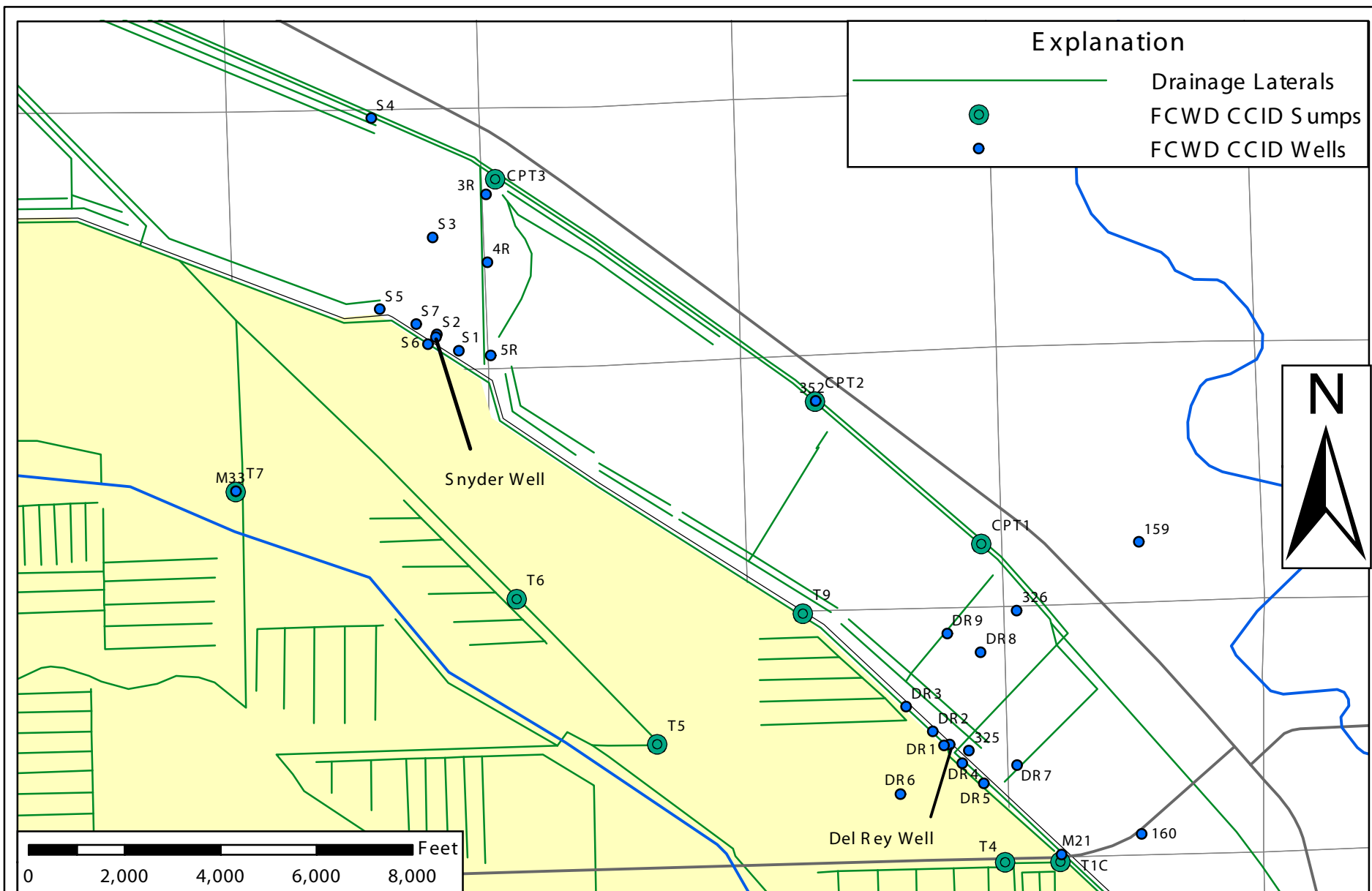


EXPLANATION

 SEMICONFINED ZONE

 CONFINING LAYER

 CONFINED ZONE



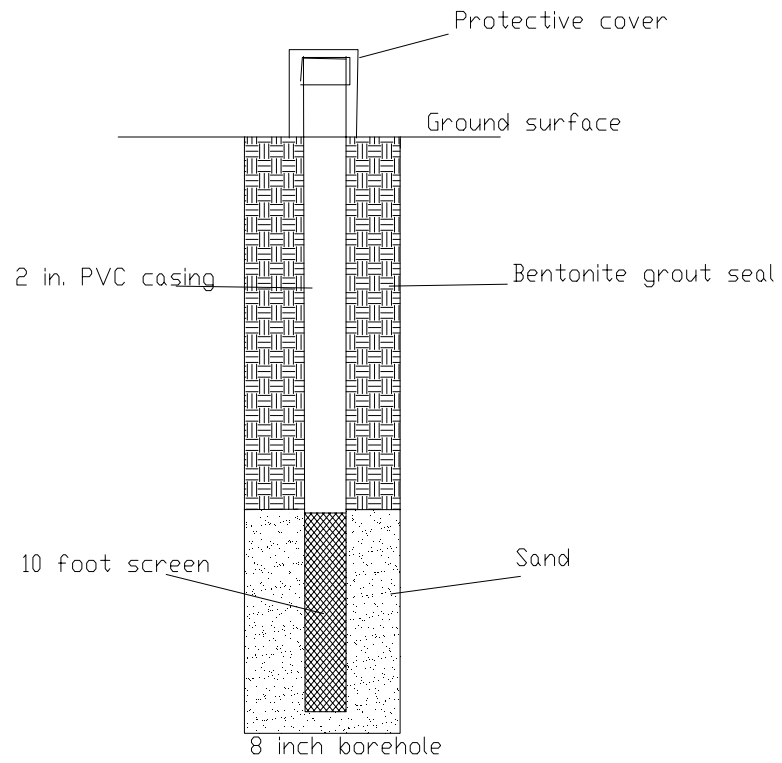


Figure 3. Monitoring well construction.

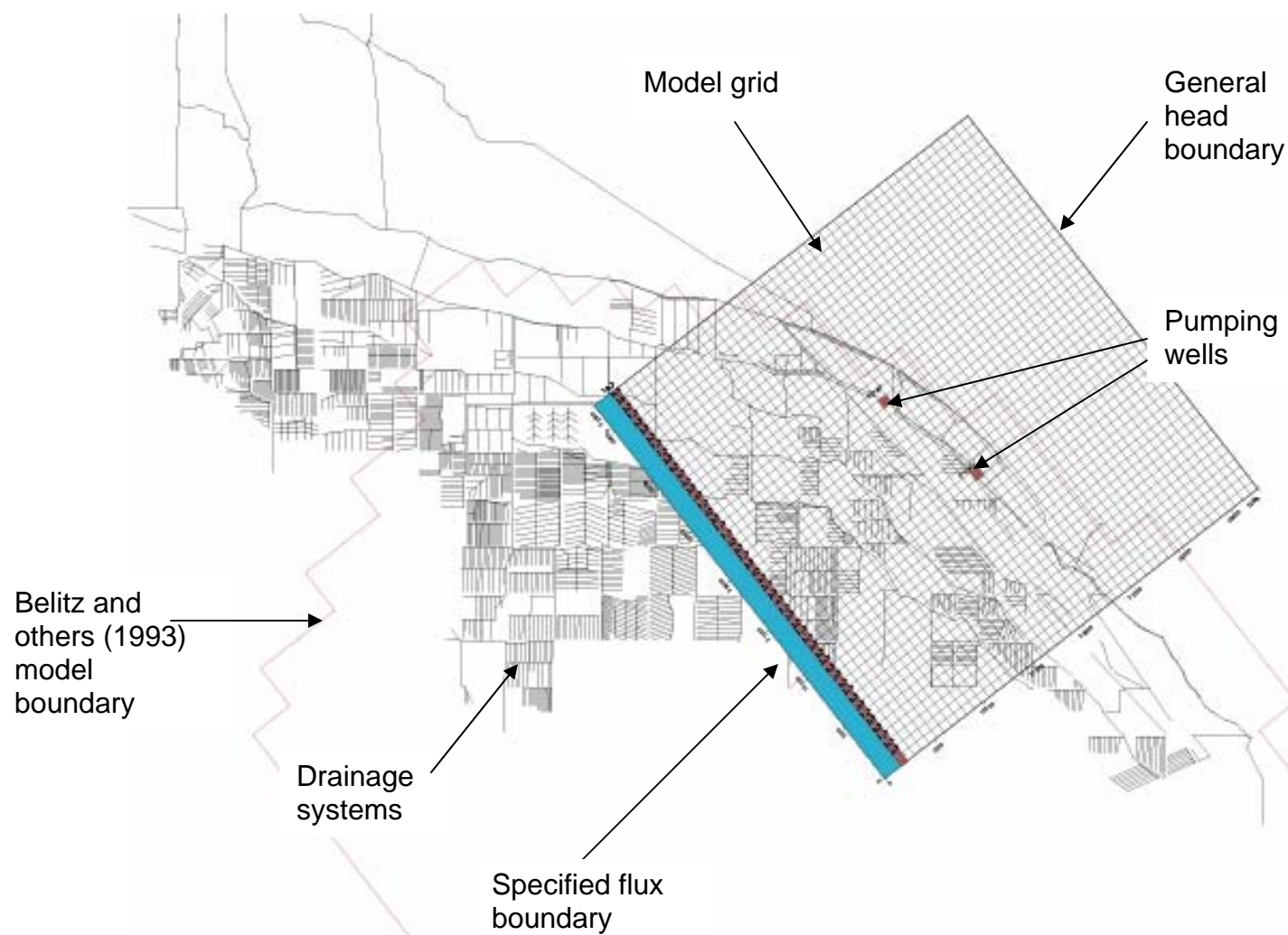


Figure 4. Groundwater flow model grid and boundary conditions.

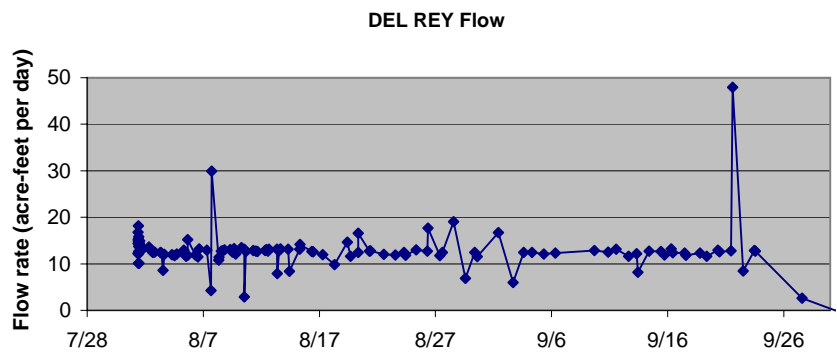
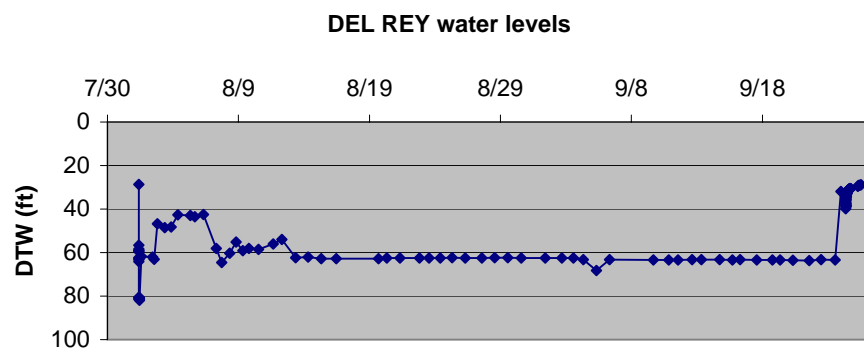
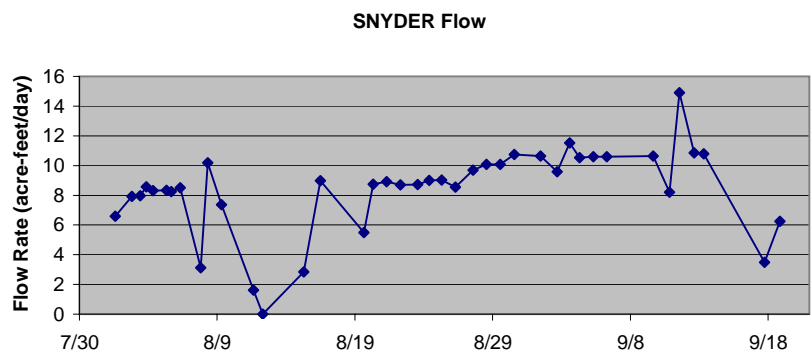
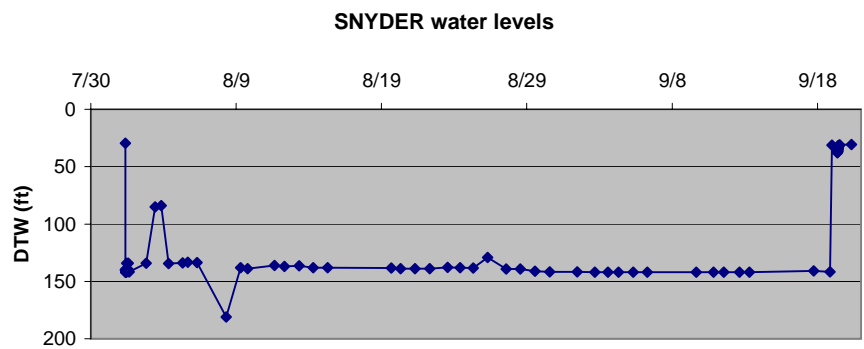
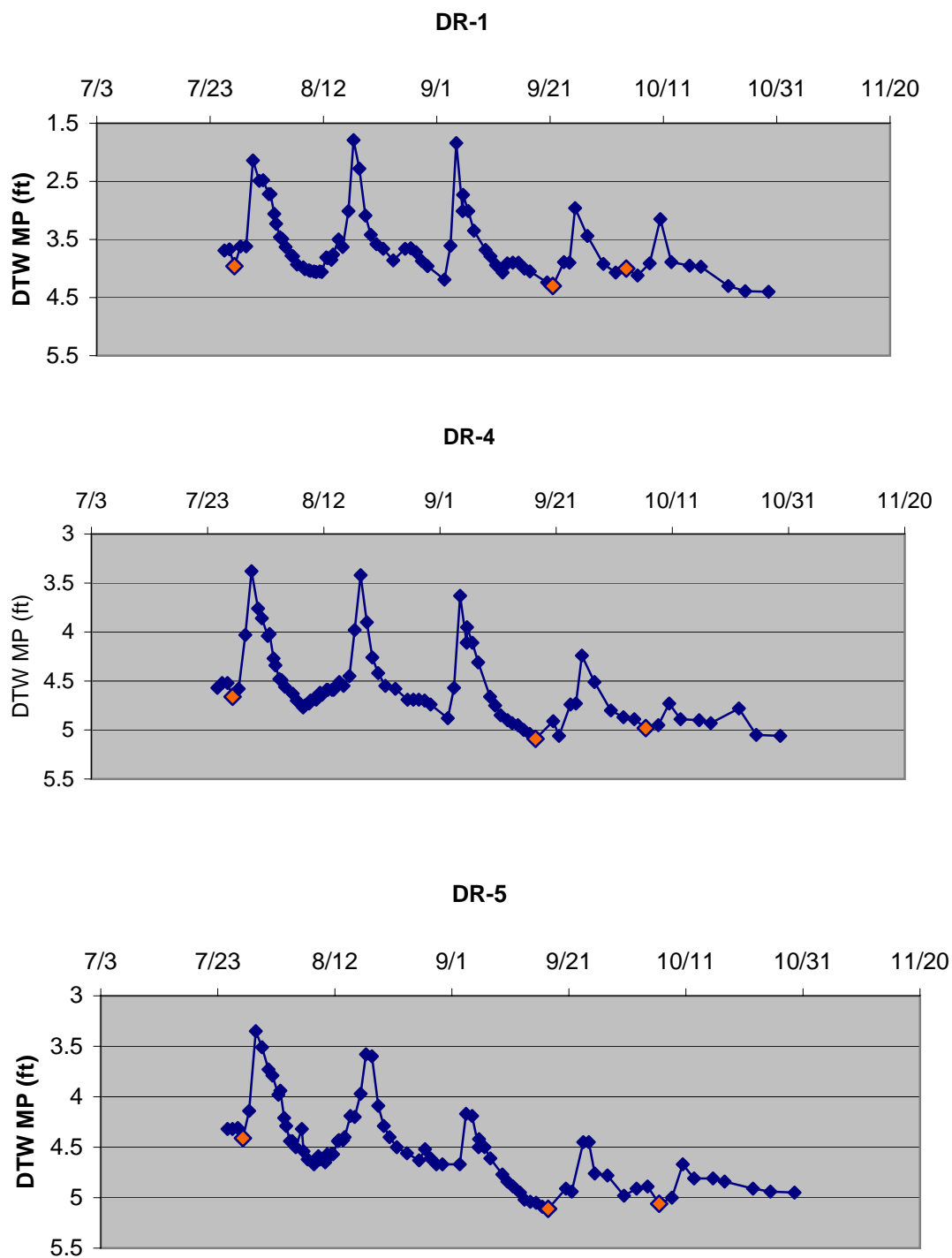


Figure 5. Water Level Changes and Pumped Volumes in the Snyder and Del Rey Wells



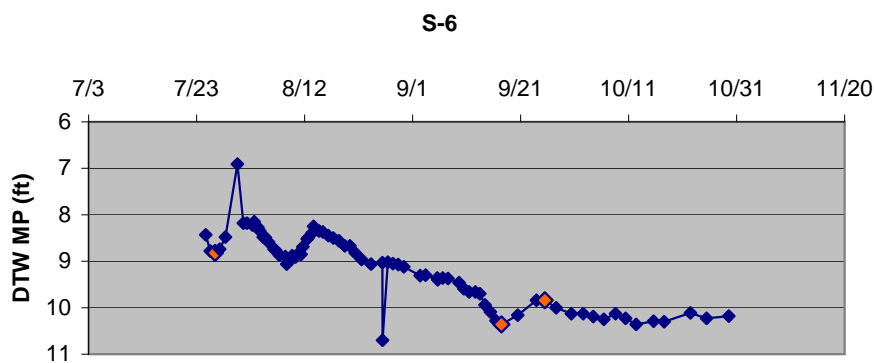
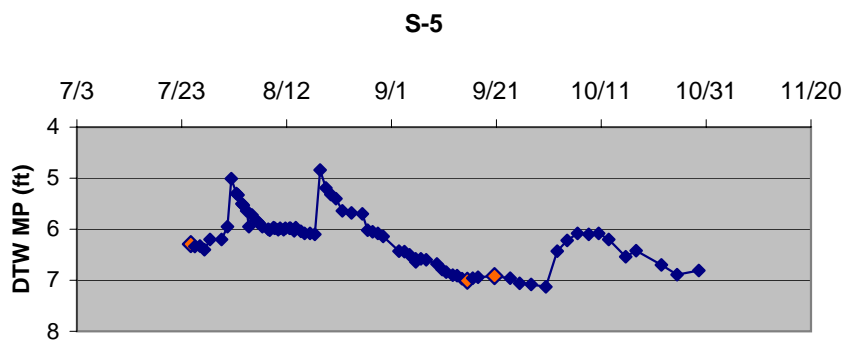
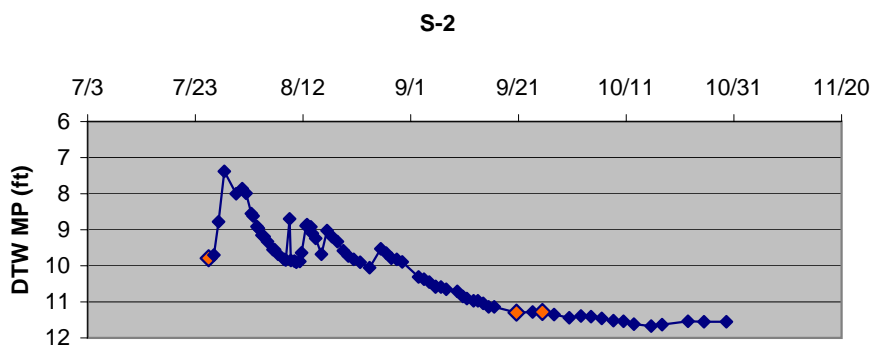
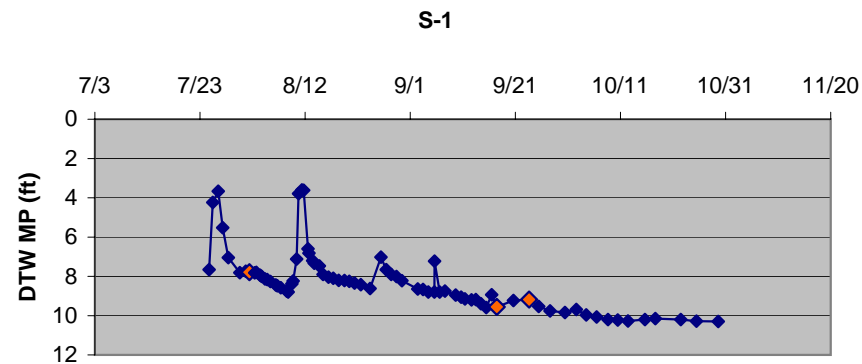
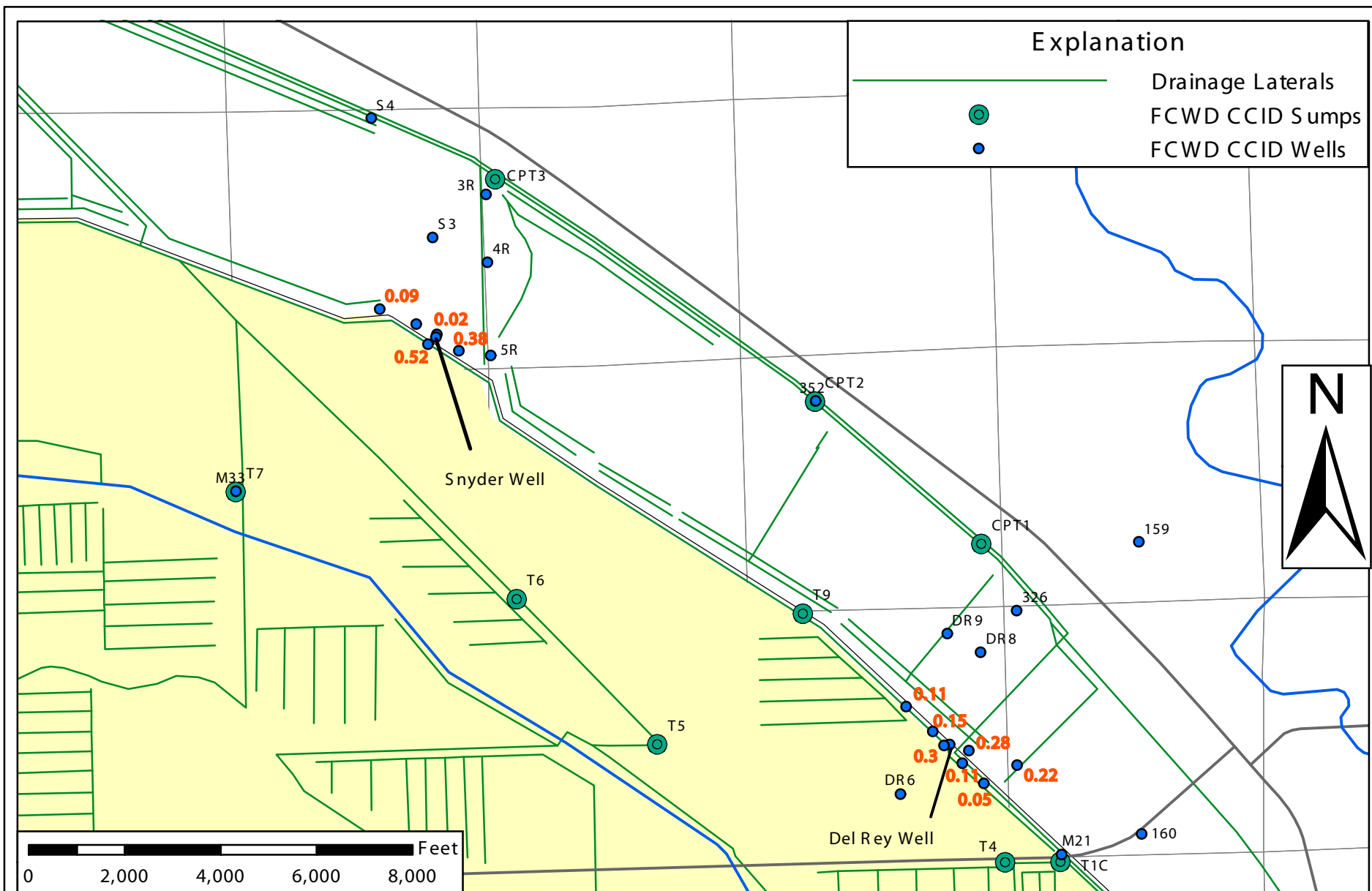


Figure 7. Example hydrographs for wells near the Snyder well. Red diamonds indicate points before and after pumping for estimating water level effect.



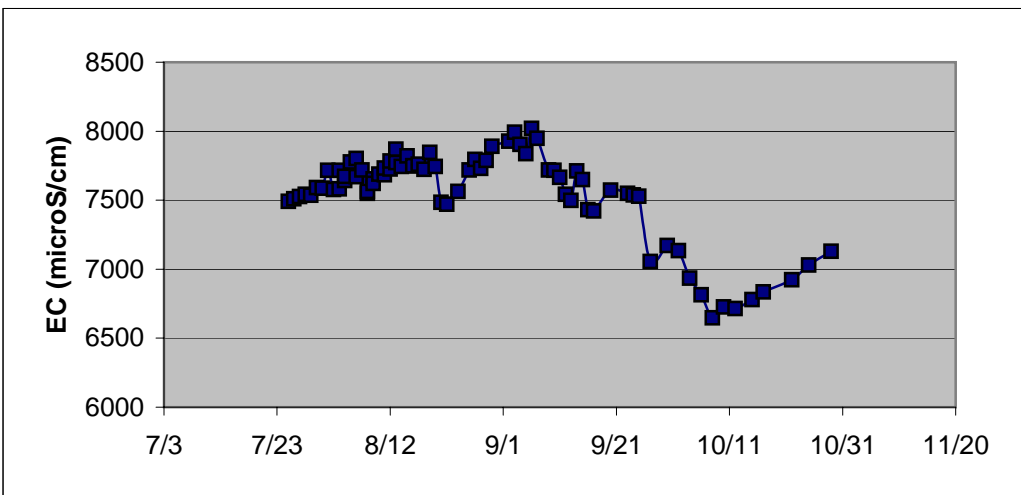
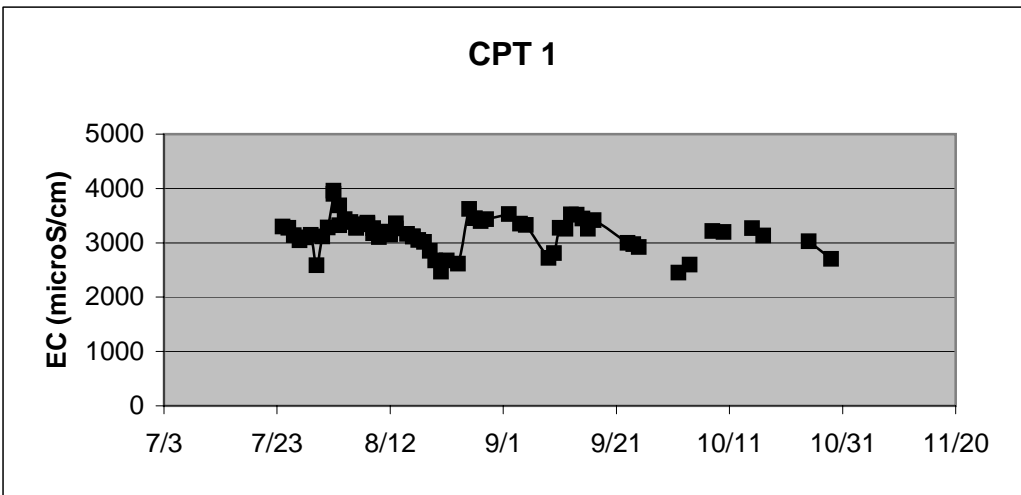
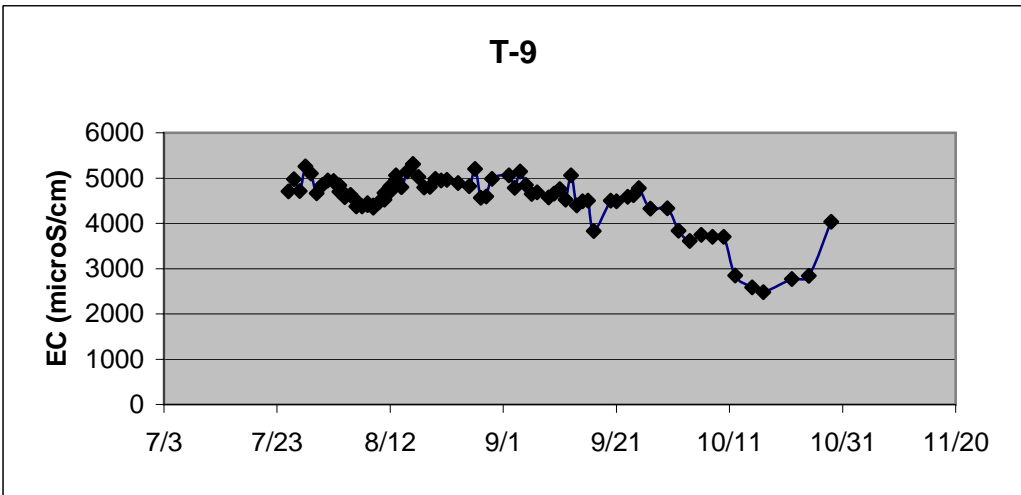


Figure 9. Electrical conductivity during the study period in drainage sumps T-9, CP1 and CPT2.

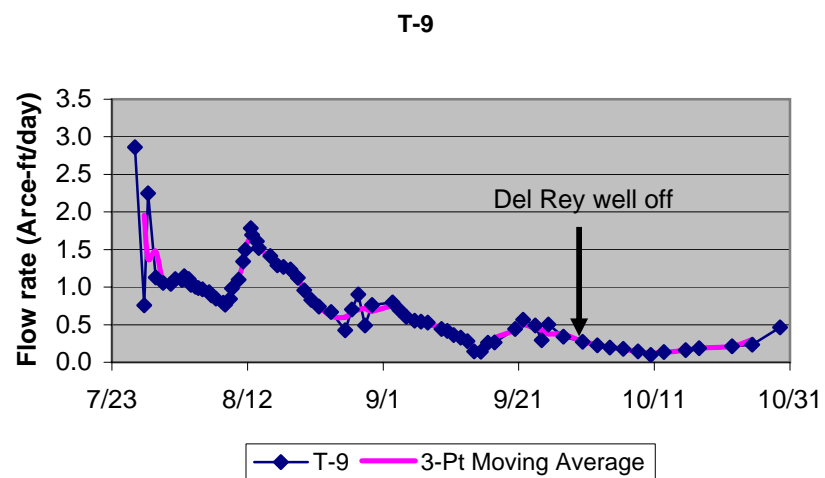
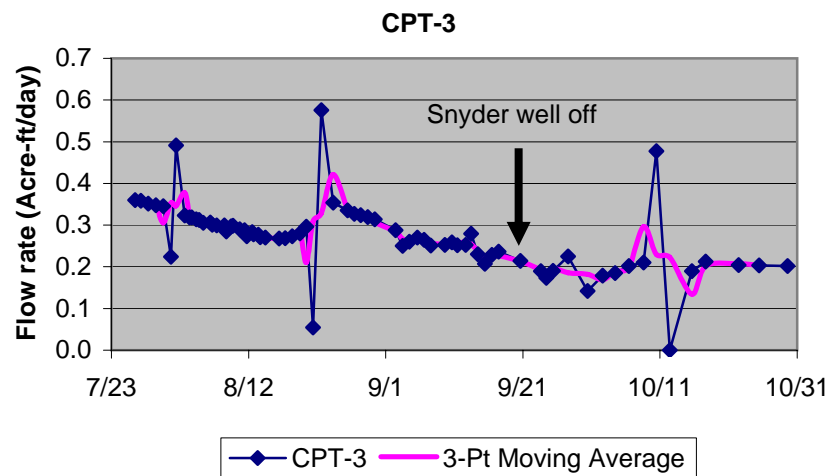
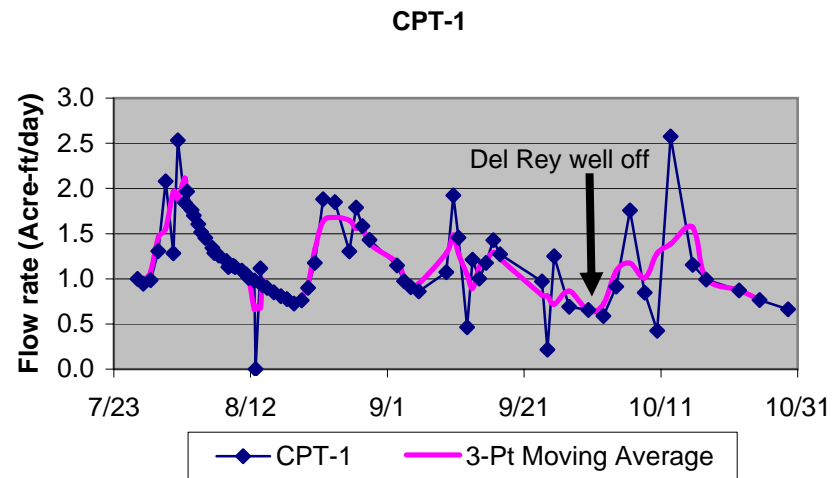


Figure 10. Drainage for CPT1, CPT3 and T9.

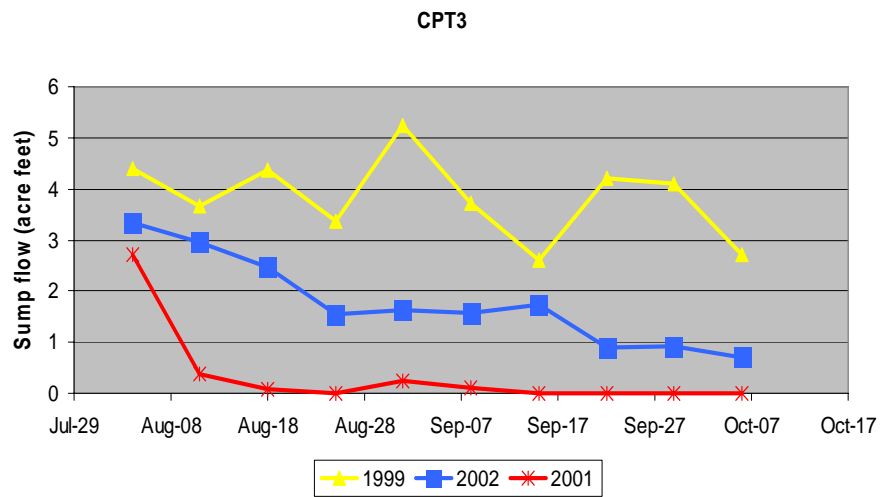
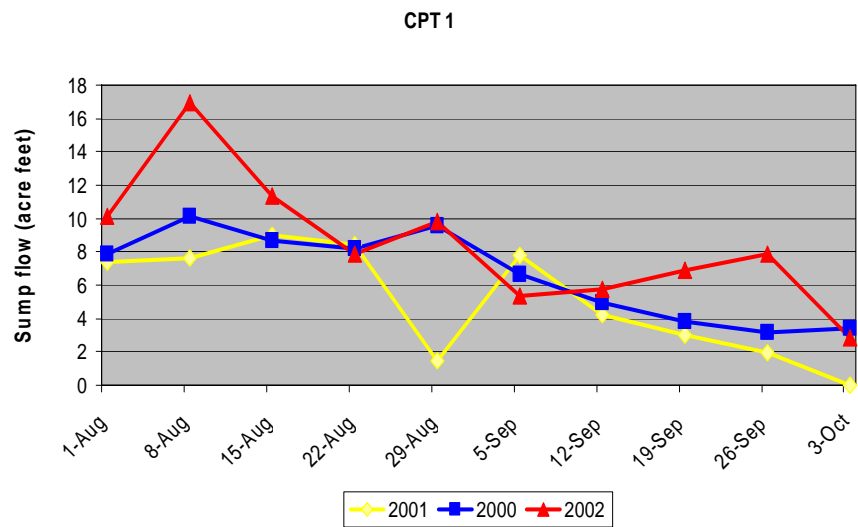


Figure 11. Comparison of 2002 drainflows with previous years.

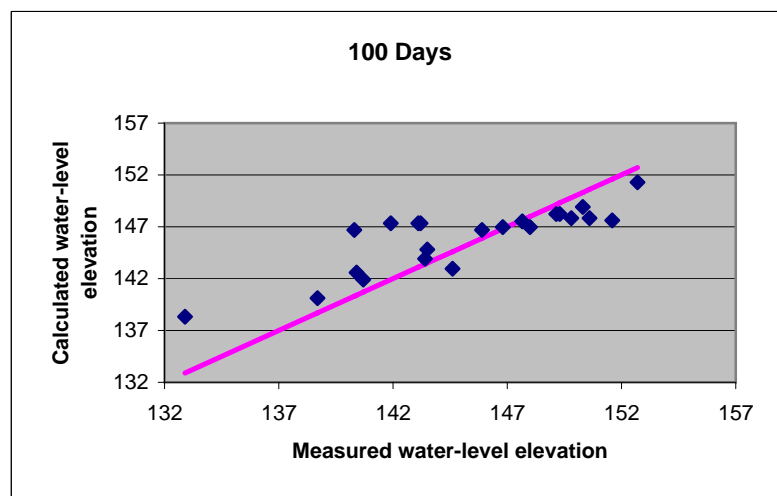
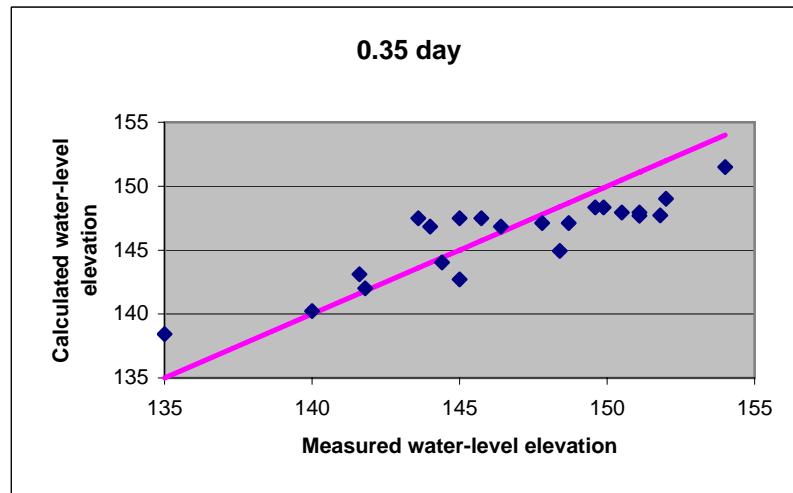


Figure 12. Comparison for measured and model-calculated water-level elevations at 0.35 and 100 days.

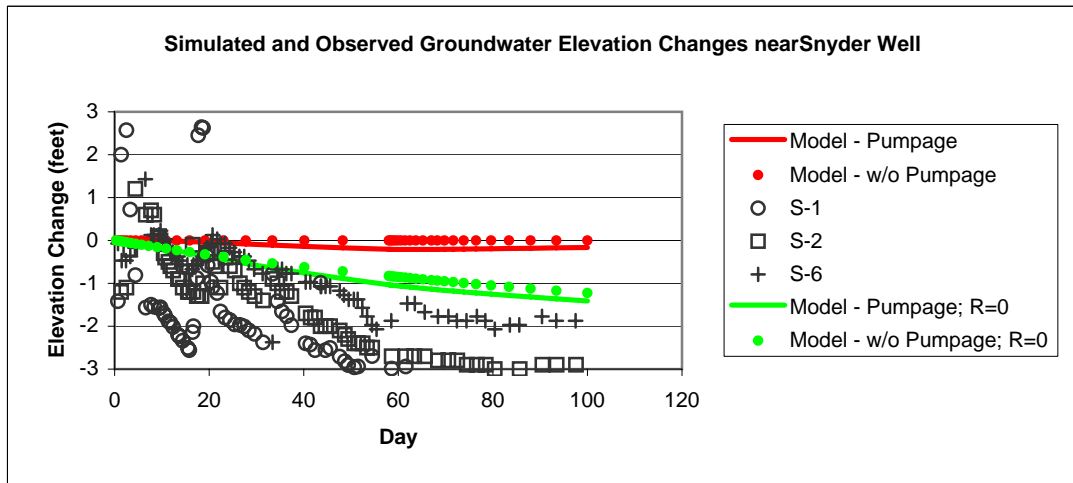
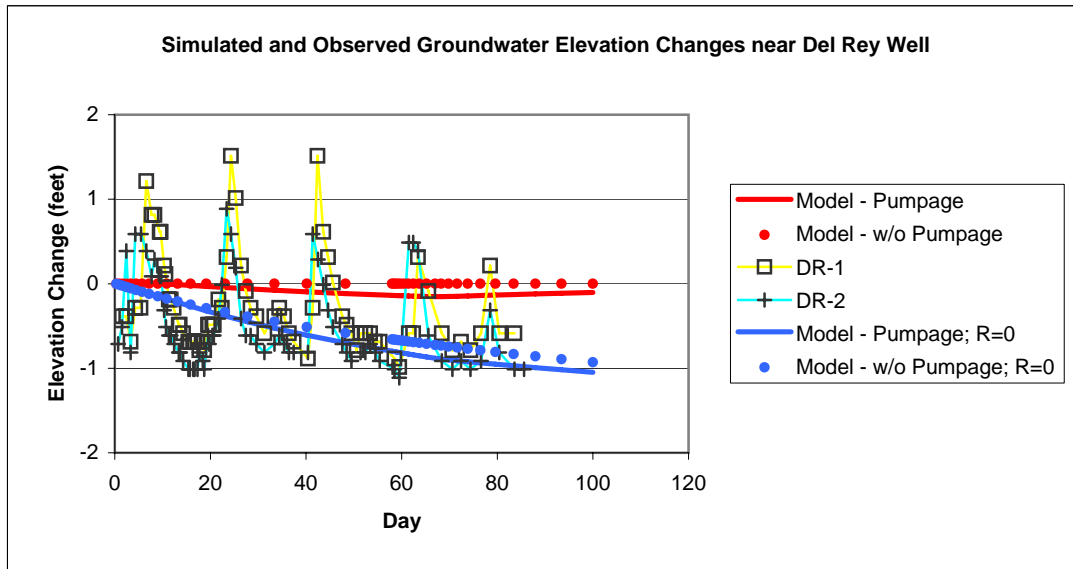


Figure 13. Comparison of measured and model-estimated elevation changes for monitoring wells near the Del Rey and Snyder wells.

APPENDIX 1

Location and Date Outside Canal	pH	Temperature °C	Conductivity µS/cm	TDS mg/L	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Cl mg/L	SO4 mg/L	HCO3 mg/L	As mg/L	B mg/L	Mo mg/L	Se mg/L
8/1/2002	7.89	24.8	586	240	25	16	65	2.4	91	59	85	< .01	0.21	0.0023	0.00062
8/12/2002	7.69	27	720	220	28	19	84	2.6	120	77	88	< .01	0.21	0.0022	0.00053
8/28/2002	7.66	25.2	777	410	27	18	99	3.9	140	83	100	< .01	0.26	< .005	0.00074
Del Rey Well															
8/1/2002	7.34	20.2	6950	4800	250	220	1000	6.9	1300	1600	210	< .01	2.3	0.0058	< .0004
8/12/2002	7.25	20.5	6550	4100	220	190	980	8.1	1300	1300	230	< .01	2	0.0064	< .0004
8/28/2002	7.27	20.3	6400	4300	230	160	1100	14	1400	1500	230	0.016	2	< .005	< .0004
Snyder Well															
8/1/2002	7.23	21.8	3795	2400	110	96	590	4.1	800	670	170	< .01	1.3	0.01	< .0004
8/12/2002	7.33	20.3	4045	2300	110	99	590	4.5	790	710	170	< .01	1.6	0.014	< .0004
8/28/2002	7.5	20.5	3745	2400	110	79	600	8.3	740	730	190	< .001	1.6	0.011	< .0004